Directional Subwoofers:

Once A Miracle, Now Easily Done

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Dansound Inc.

Presented to the Pacific Northwest Section,
Audio Engineering Society

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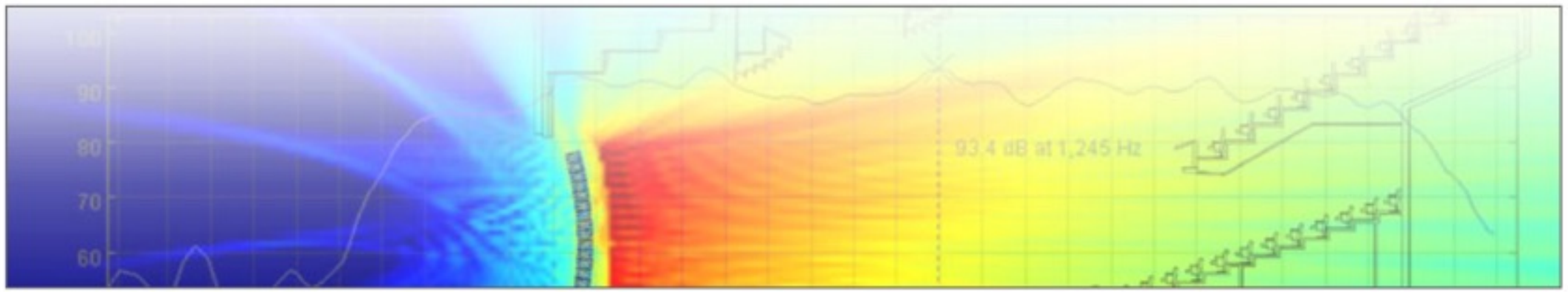
Edmonds Performing Arts Center

MAPP Online Pro



MAPP Online Pro | Features | Quick Start | Loudspeaker Measurements | Acoustical Information

MAPP Online Pro

The ability to predict the performance of a sound system is indispensable to system designers in every application. Meyer Sound combined rigorous scientific techniques and careful, high-resolution measurements with direct input from leading designers and years of experience to produce the MAPP Online Pro acoustical prediction program.

Based on a patented method, MAPP Online Pro is a powerful, cross-platform, Java-based application for accurately predicting the coverage pattern, frequency response, impulse response, and maximum SPL output of single or arrayed Meyer Sound loudspeakers. Residing on the user's local computer, the Java client application facilitates configuring arrays of a wide variety of Meyer Sound products and, optionally, defining the environment in which they will operate, including air temperature, pressure and humidity, as well as the location and composition of surfaces. Most 2D CAD (.DXF) files can be imported directly for accurate venue definition.

> "It's a lifesaver when you don't meet the FOH mixer until show day. You simply send each other MAPP files. Very nice, indeed!"
>
> — Andri Gunnarsson, System Technician, Exton

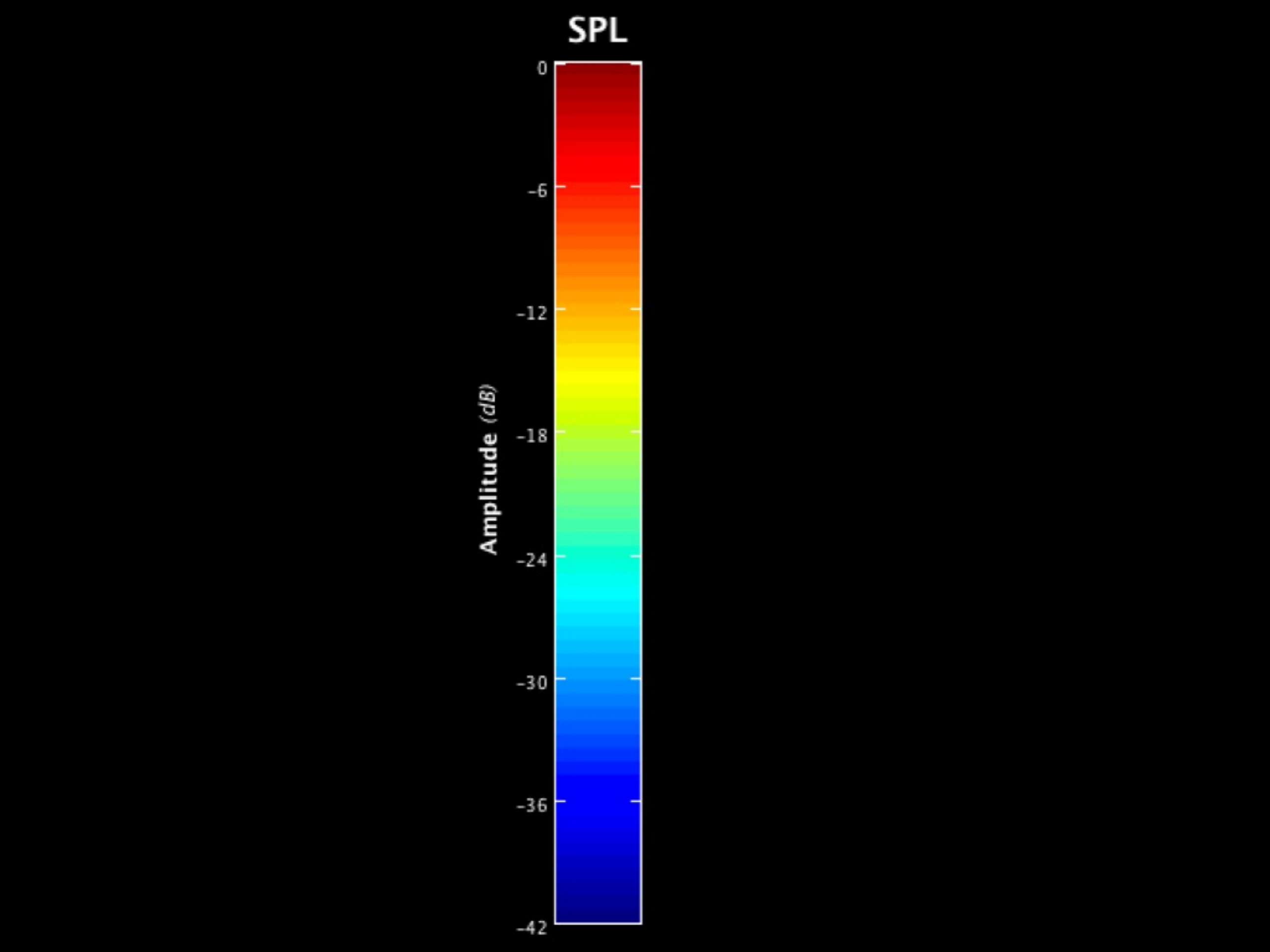
Apply for MAPP Online Pro

Account Info & Lost Passwords

Release Notes

SUPPORT RESOURCES

MAPP Online Pro Modes Product Tutorial


SPL
0
-6
-12
-18
-24
-30
-36
-42
Amplitude (dB)

USW-1P SPECIFICATIONS

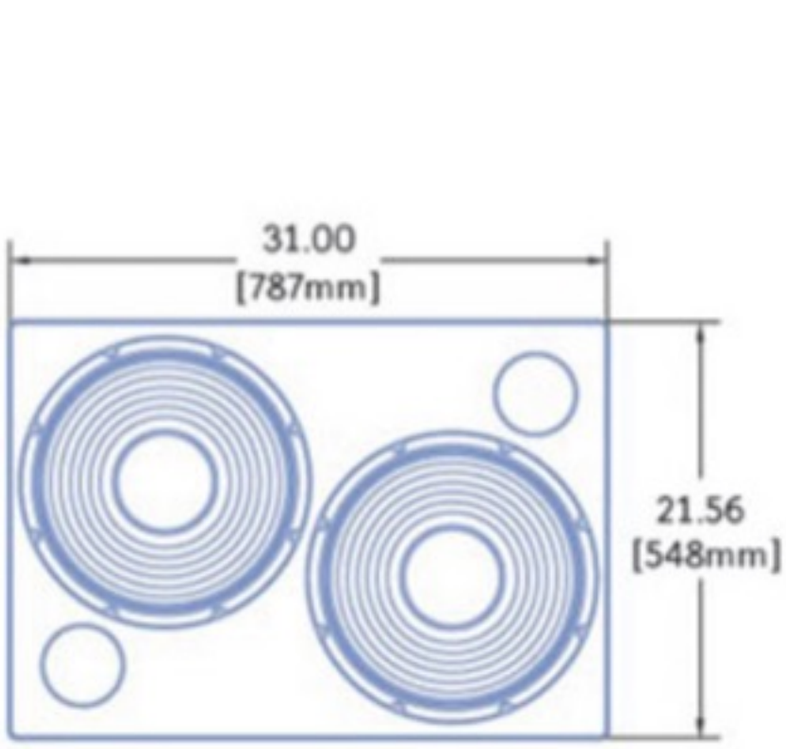
ACOUSTICAL		
	Operating Frequency Range[1]	32 Hz – 200 Hz
	Frequency Response[2]	35 Hz – 180 Hz ±4 dB
	Phase Response	45 Hz – 155 Hz ±30°
	Maximum Peak SPL[3]	135 dB
	Dynamic Range	›110
COVERAGE		
		360° single unit; varies for multiple units, depending on number and configuration
TRANSDUCERS		
	Low Frequency	Two 15" cone drivers Nominal impedance: 4 Ω Voice coil size: 3" Power-handling capability: 400 W[4]
AUDIO INPUT		
	Type	Differential, electronically balanced
	Maximum Common Mode Range	±15 V DC, clamped to earth for voltage transient protection
	Connectors	Female XLR input with male XLR loop output or VEAM all-in-one (integrates AC, audio and network)
	Input Impedance	10 kΩ differential between pins 2 & 3
	Wiring	Pin 1: Chassis/earth through 220 kΩ, 1000 pF, 15 V clamp network to provide virtual ground lift at audio frequencies Pin 2: Signal + Pin 3: Signal – (optional polarity reversal switch)[5] Case: Earth ground and chassis
	DC Blocking	Differential DC blocking up to max common mode voltage
	CMRR	›50 dB, Typically 80 dB (50 Hz – 500 Hz)
	RF Filter	Common Mode: 425 kHz; Differential Mode: 142 kHz
	TIM Filter	‹80 kHz, integral to signal processing
	Nominal Input Sensitivity	0 dBV (1 V rms, 1.4 V pk) continuous is typically the onset of limiting for pink noise and music
	Input Level	Audio source must be capable of producing a minimum of +20 dBV (10 V rms, 14 V pk) into 600 Ω in order to produce maximum peak SPL over the operating bandwidth of the loudspeaker

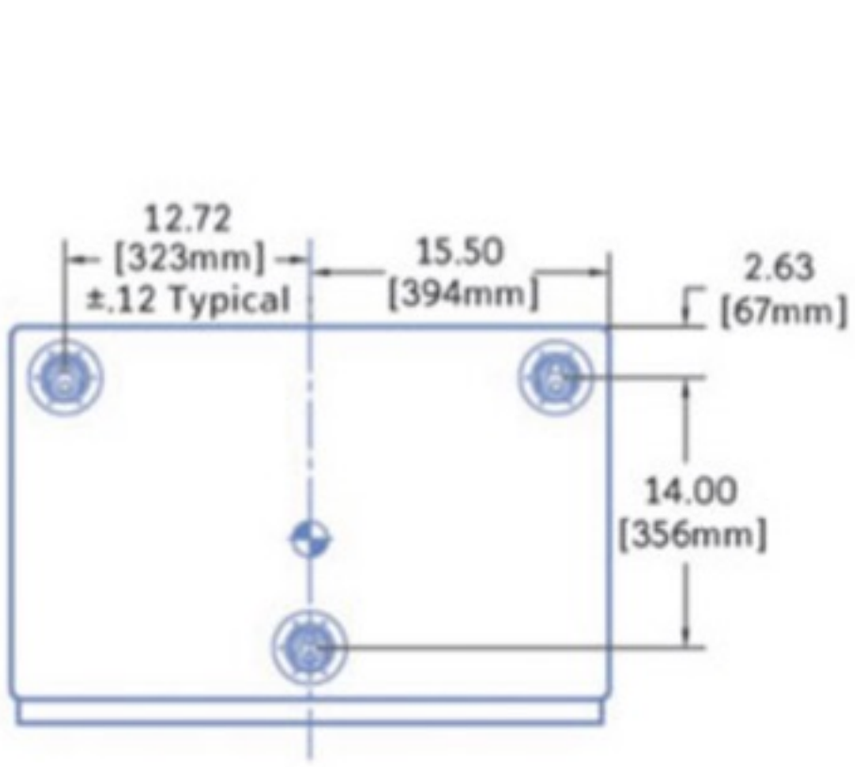
Amplifier

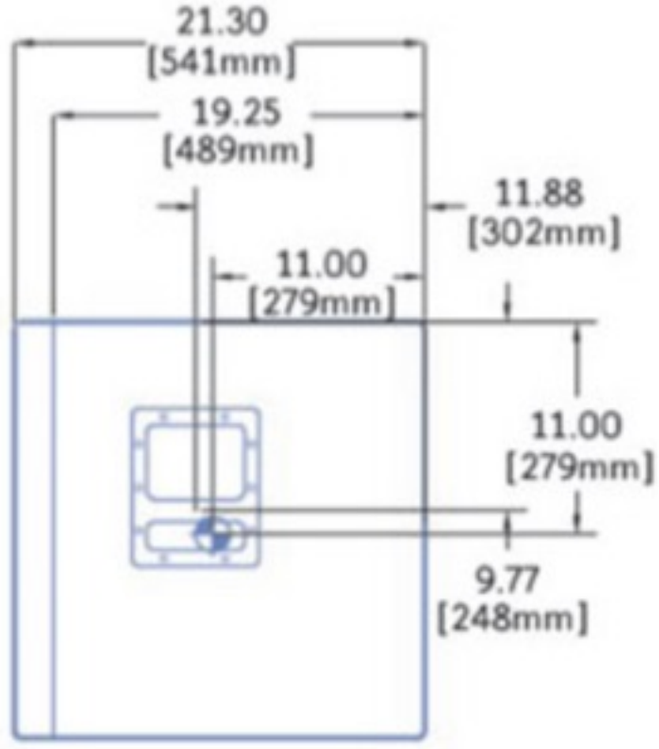
Type	Two-channel complementary MOSFET output stages (class AB/ bridged)
Output Power[6]	550 W total
THD, IM, TIM	‹.02 %
Load Capacity	4 Ω both channels
Cooling	Convection; 24 V DC output for optional external fan

AC Power

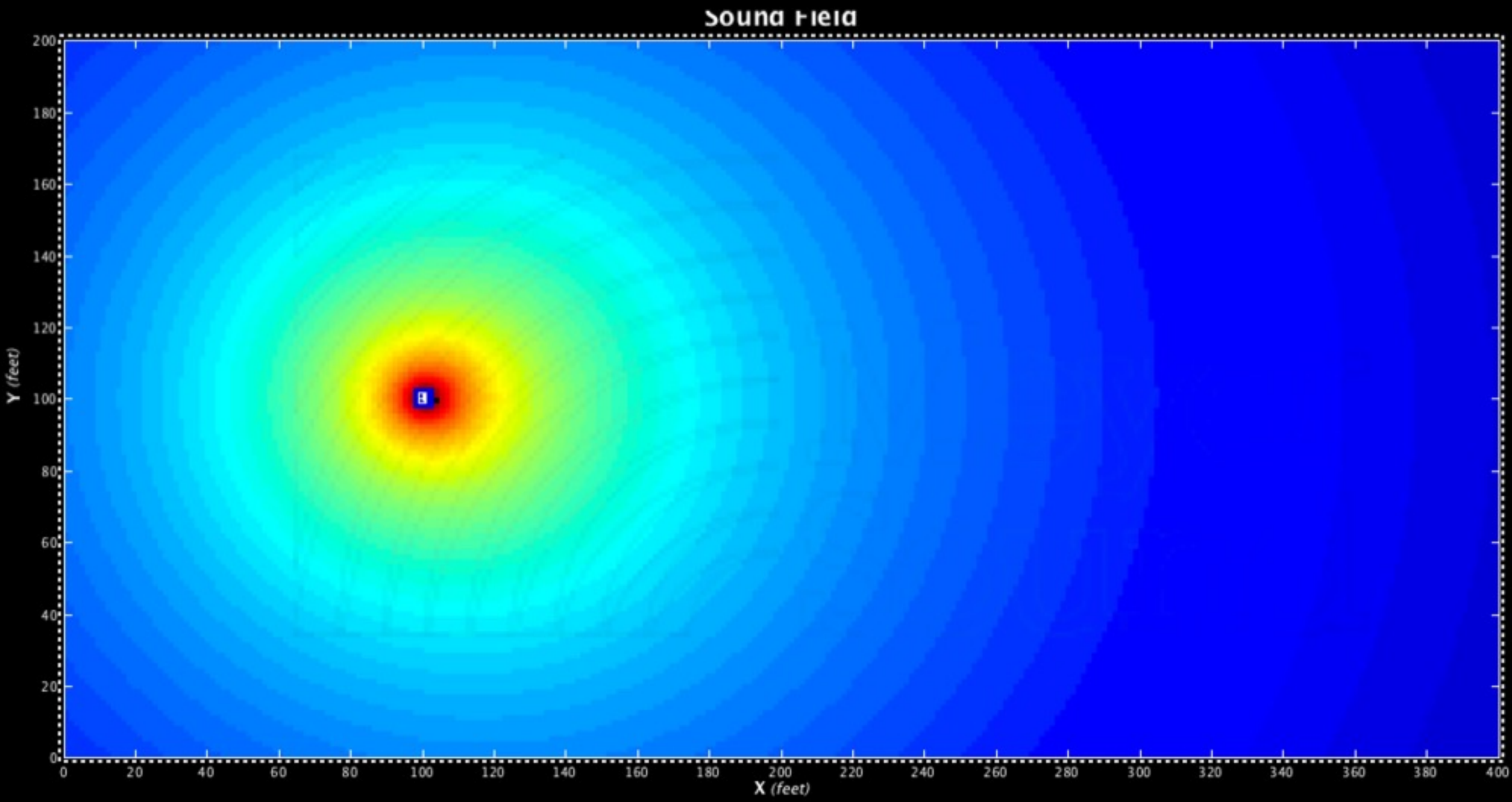
Connector	PowerCon or VEAM
Automatic Voltage Selection	Automatic, continuous range from 90 V AC – 265 V AC
Safety Agency Rated Operating Range	100 V AC – 240 V AC; 50/60 Hz
Turn-on and Turn-off Points	90 V AC on, no turn-off, only fuse protected above 265 V AC[7]
Current Draw:	
Idle Current	.0.25 A rms (115 V AC); 0.13 A rms (230 V AC); 0.3 A rms (100 V AC)
Max Long-Term Continuous Current (›10 sec)	2.8 A rms (115 V AC); 1.4 A rms (230 V AC); 3.2 A rms (100 V AC)
Burst Current (‹1 sec)	3.2 A rms (115 V AC); 1.6 A rms (230 V AC); 3.7 A rms (100 V AC)
Ultimate Short-Term Peak Current Draw	5.0 A pk (115 V AC); 2.5 A pk (230 V AC); 5.8 A pk (100 V AC)
Inrush Current	‹9 A pk (115 V AC and 230 V AC)







Non-Directional



Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

1 USW 63Hz

80 100 120 140 160

Air Attenuation On

Temperature = 68.0°F

Pressure = 1,013.25 mb

Relative Humidity = 50.0%

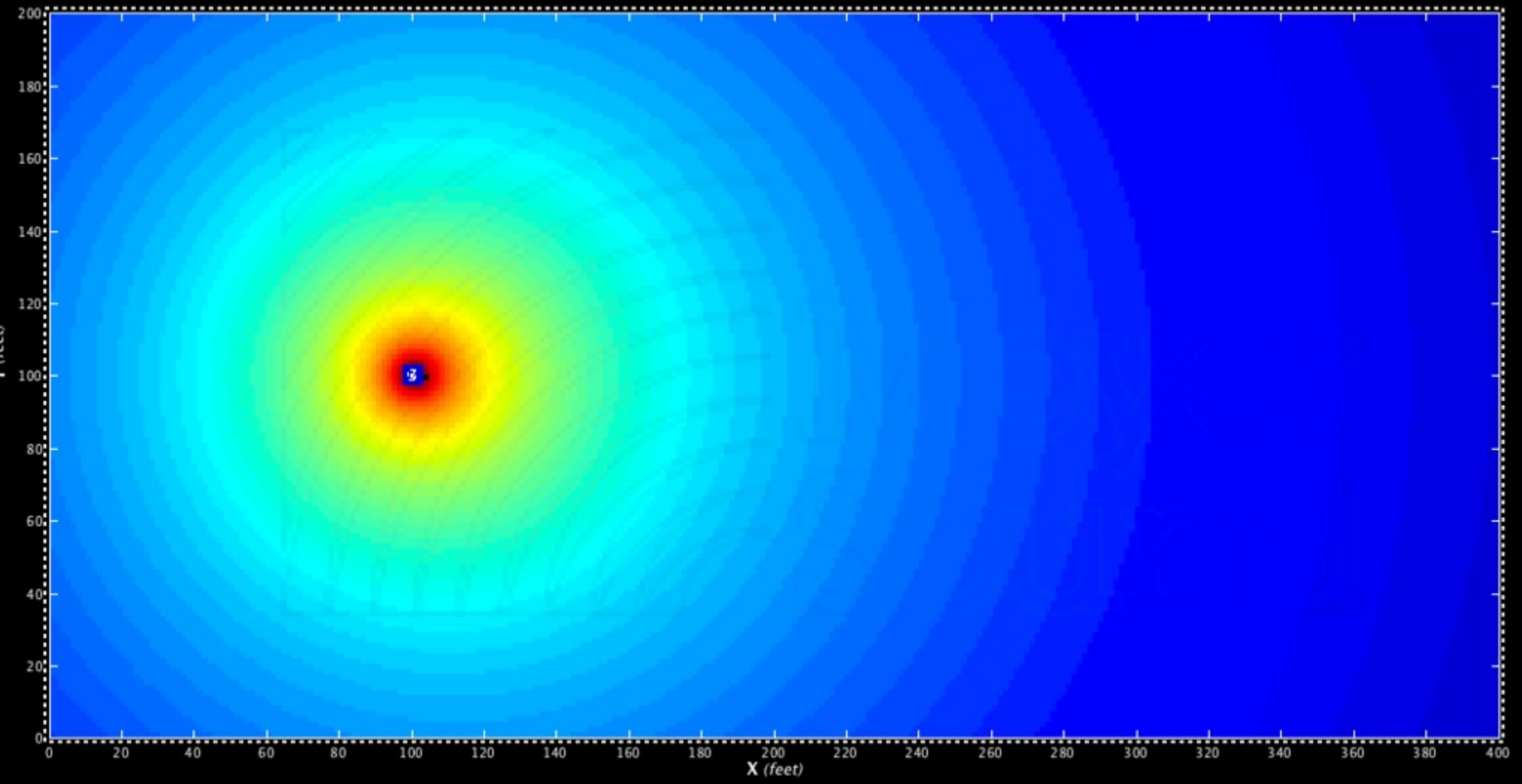
300 320 340

Relative Bandwidth = 1 octave

Center Frequency = 63 Hz

Start Frequency = 45.4 Hz

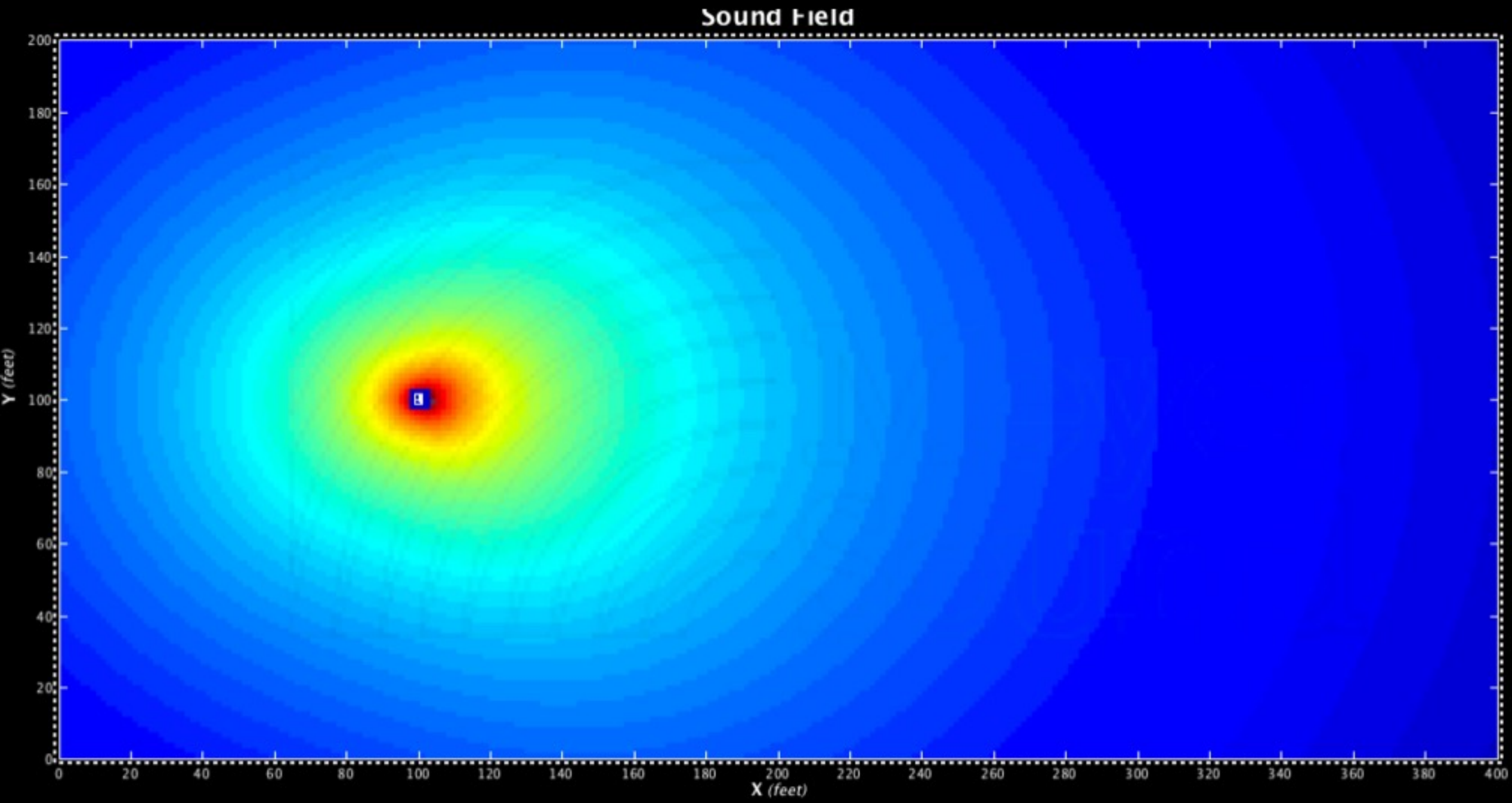
Stop Frequency = 89.4 Hz



Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 31.5 Hz
Start Frequency = 23.4 Hz
Stop Frequency = 45.4 Hz

1 USW 31.5Hz

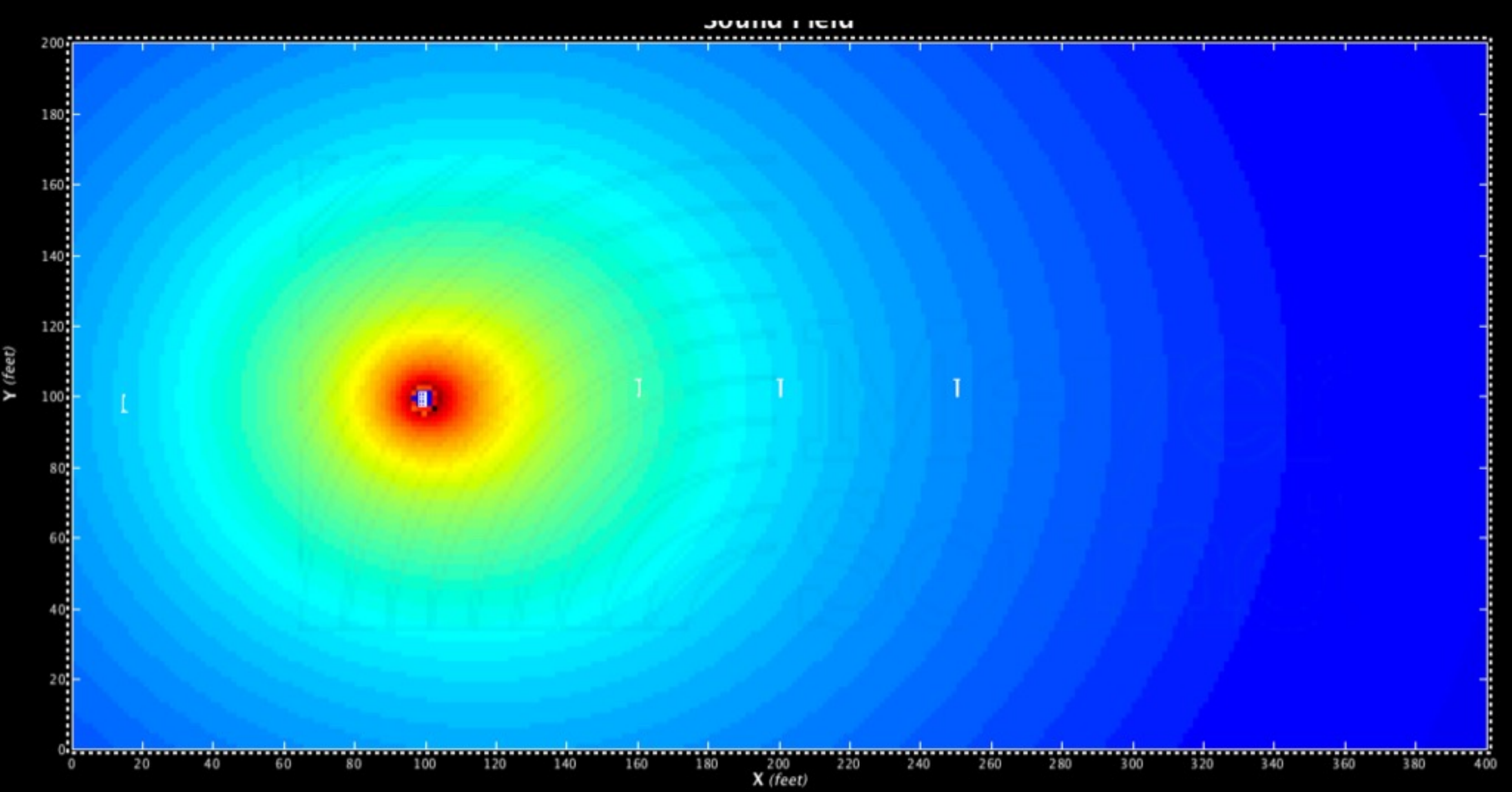


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 125 Hz
Start Frequency = 89.4 Hz
Stop Frequency = 178.7 Hz

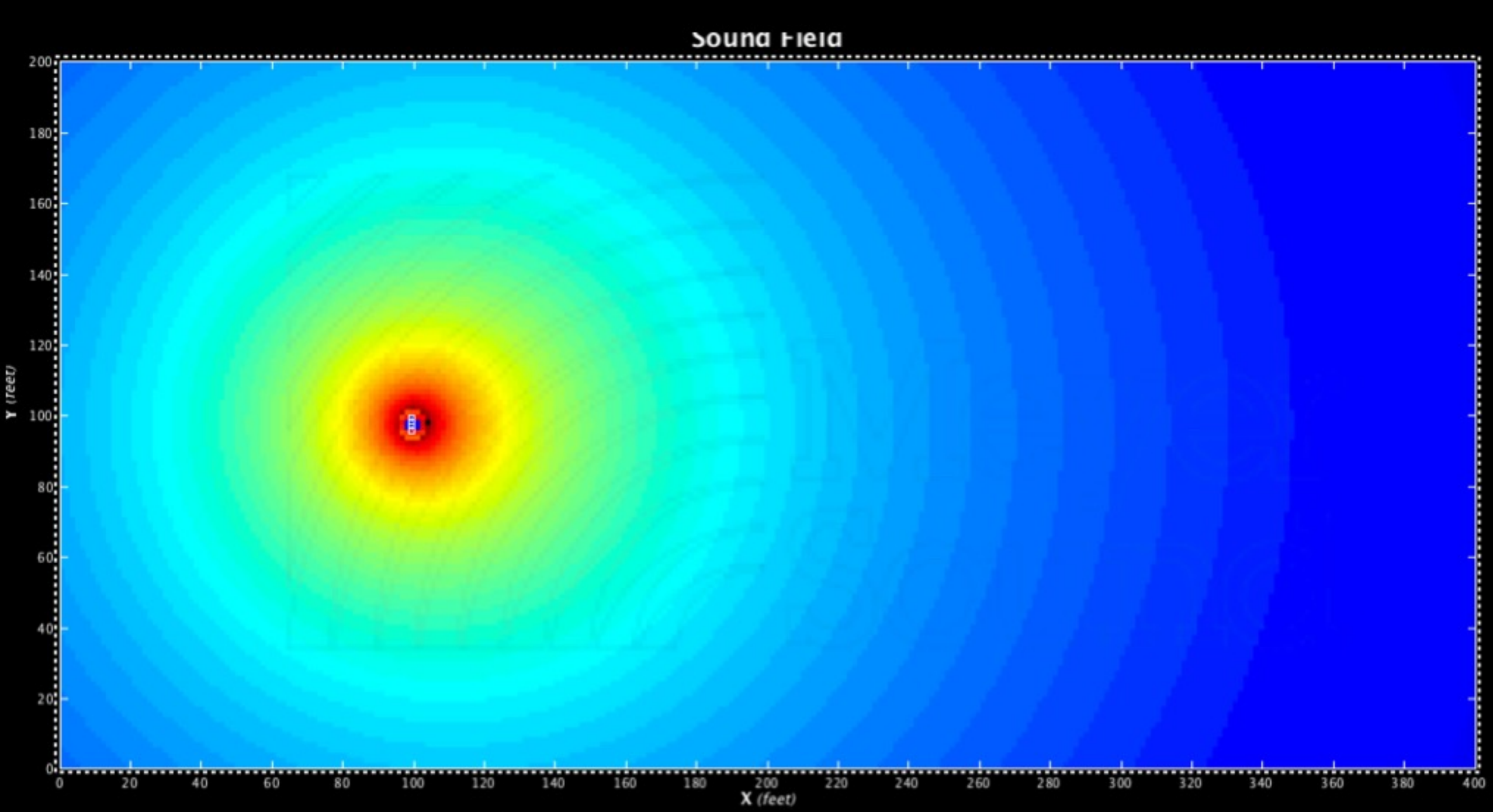
1 USW 125Hz



Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

2 USW 0ms 63Hz

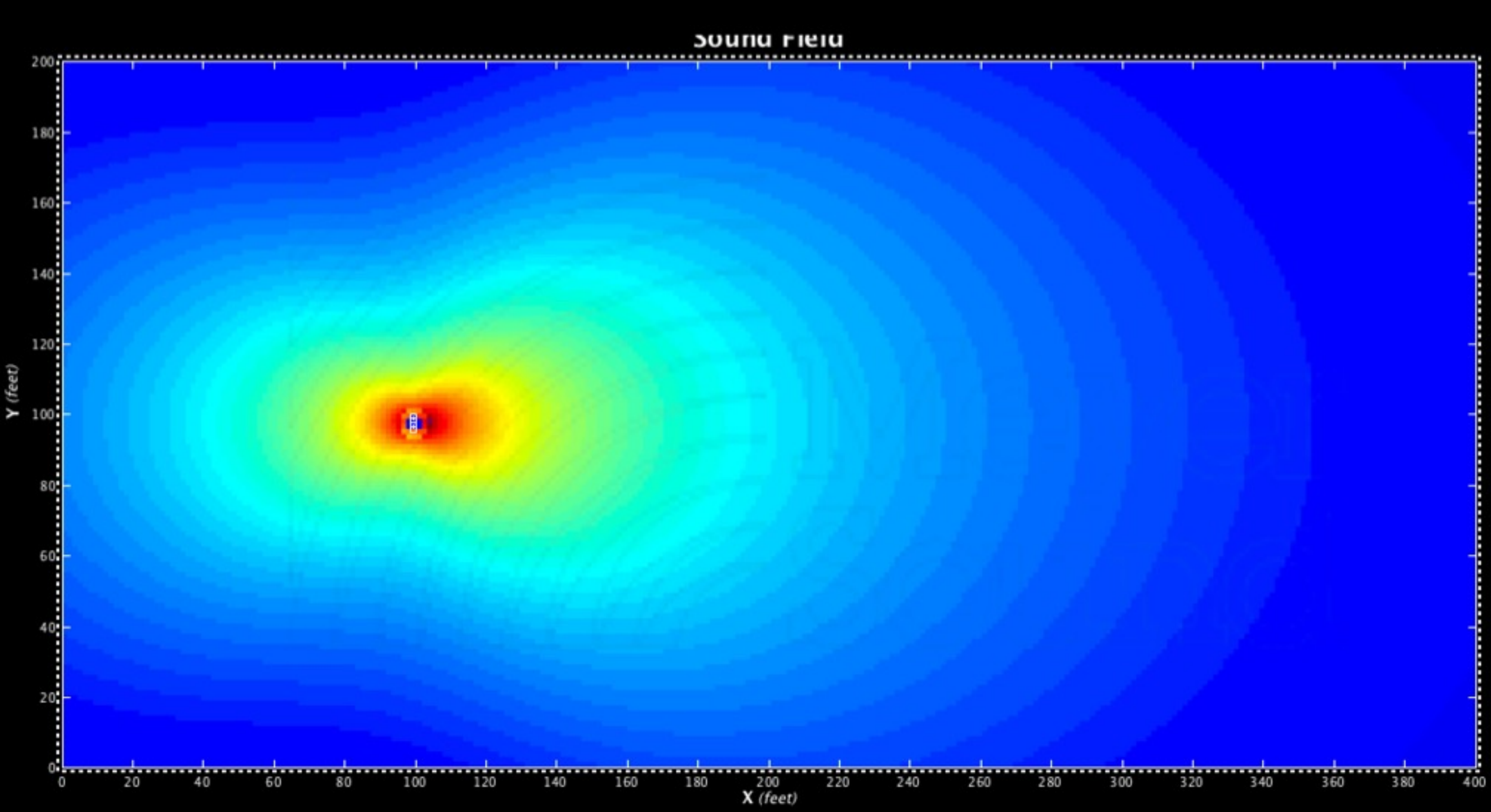


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 31.5 Hz
Start Frequency = 29.3 Hz
Stop Frequency = 36.6 Hz

2 USW 31.5Hz

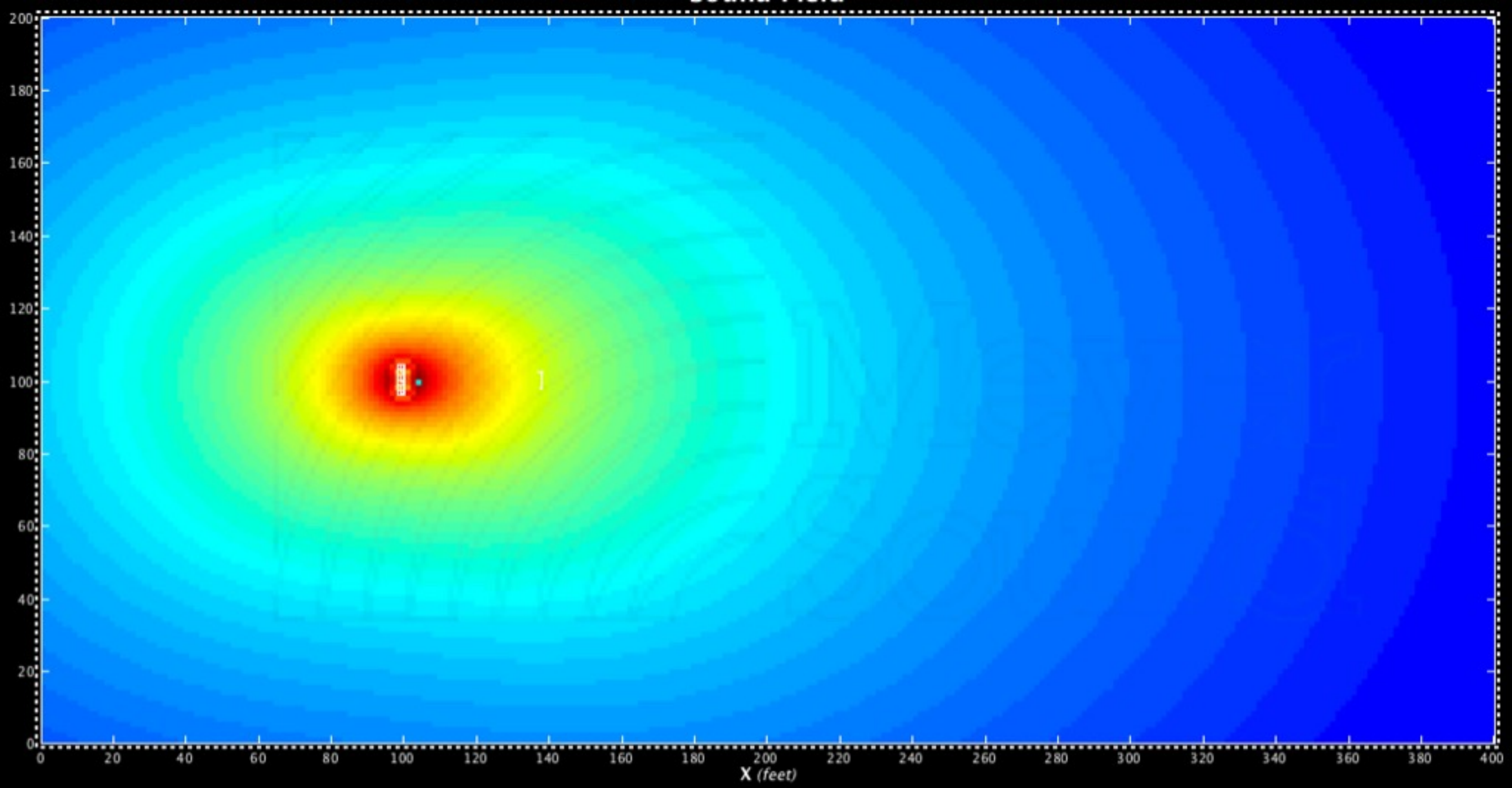


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 125 Hz
Start Frequency = 112.8 Hz
Stop Frequency = 140.6 Hz

2 USW 125Hz

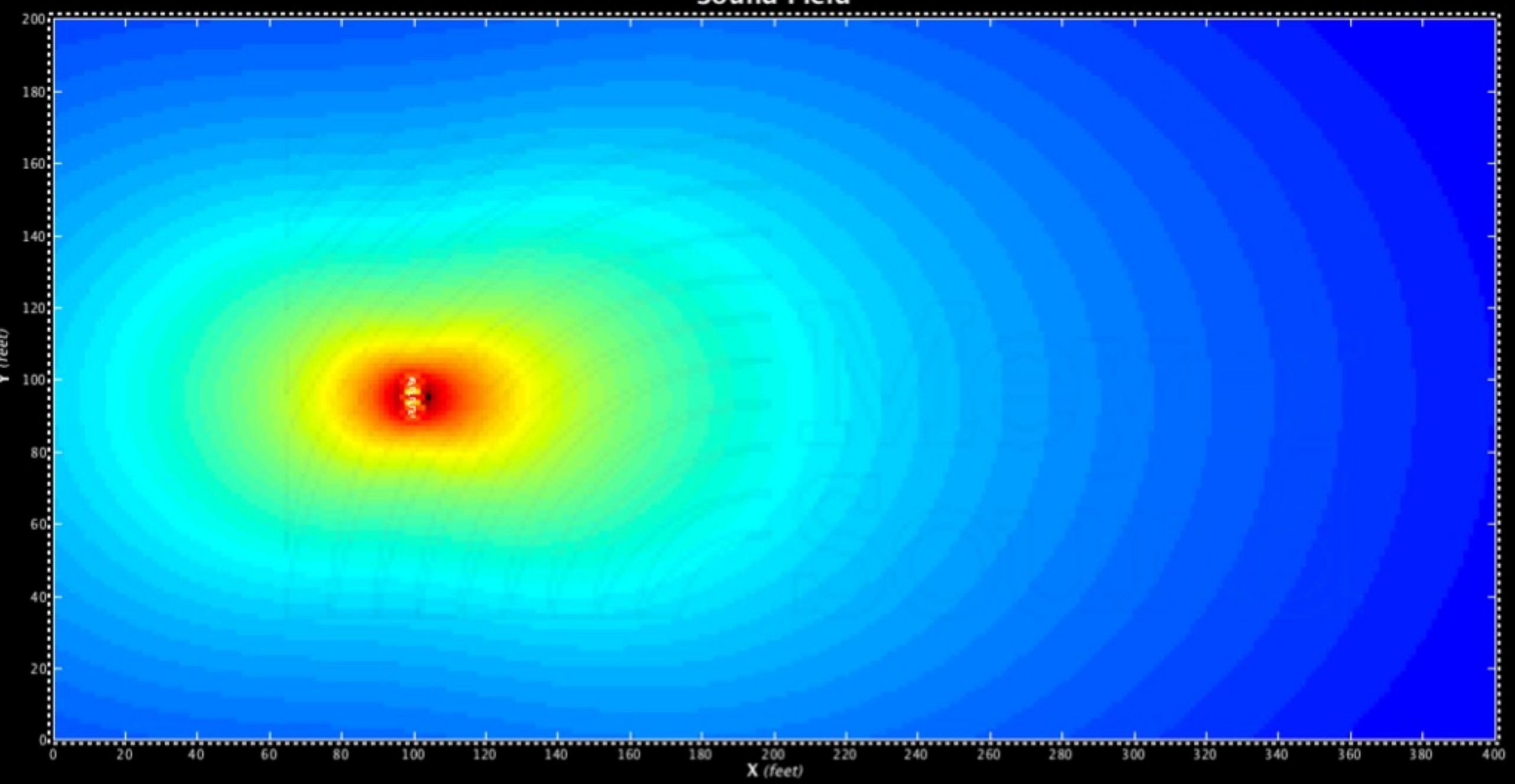


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

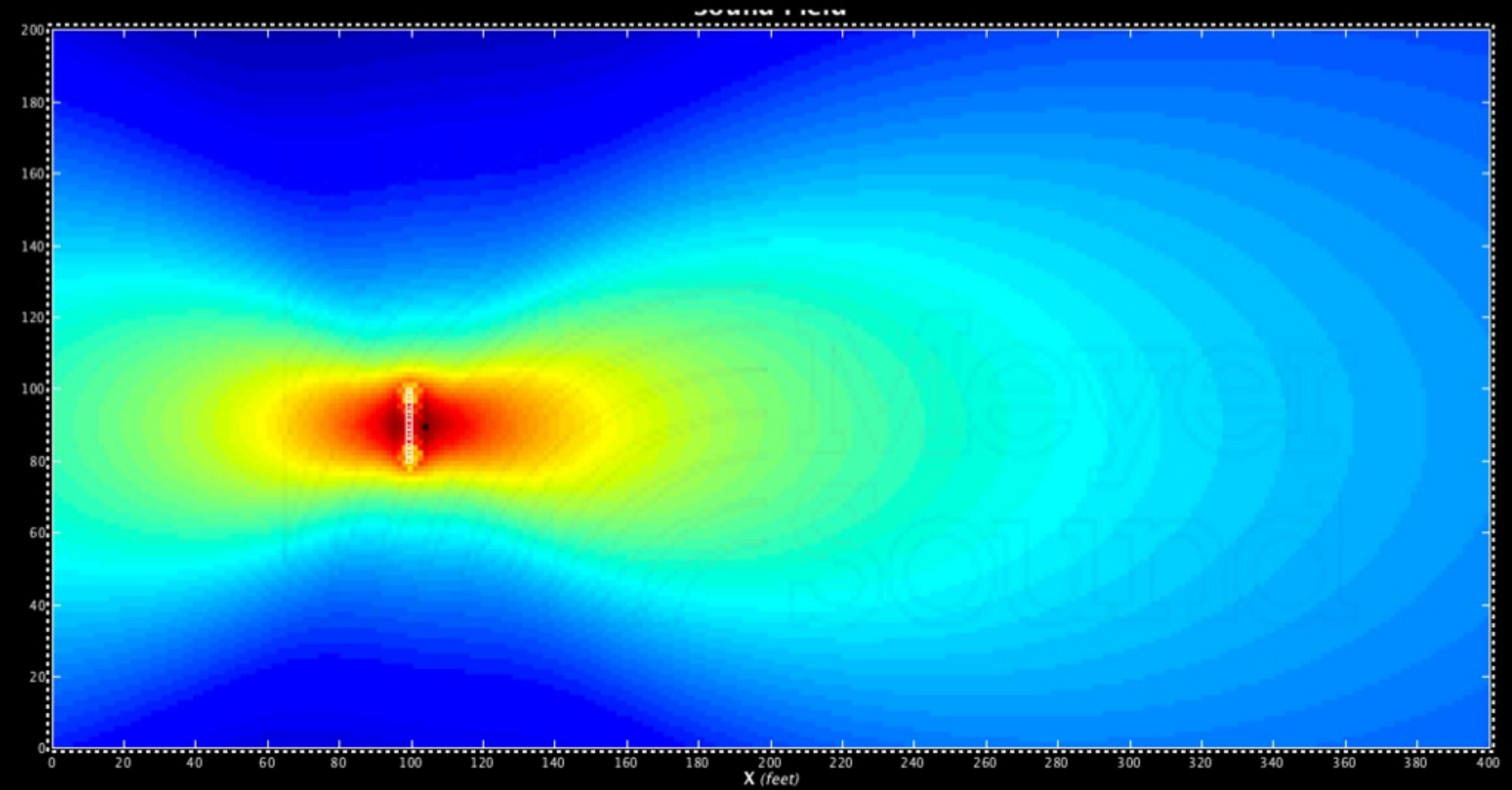
3 USW 63Hz



Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

4 USW 63Hz



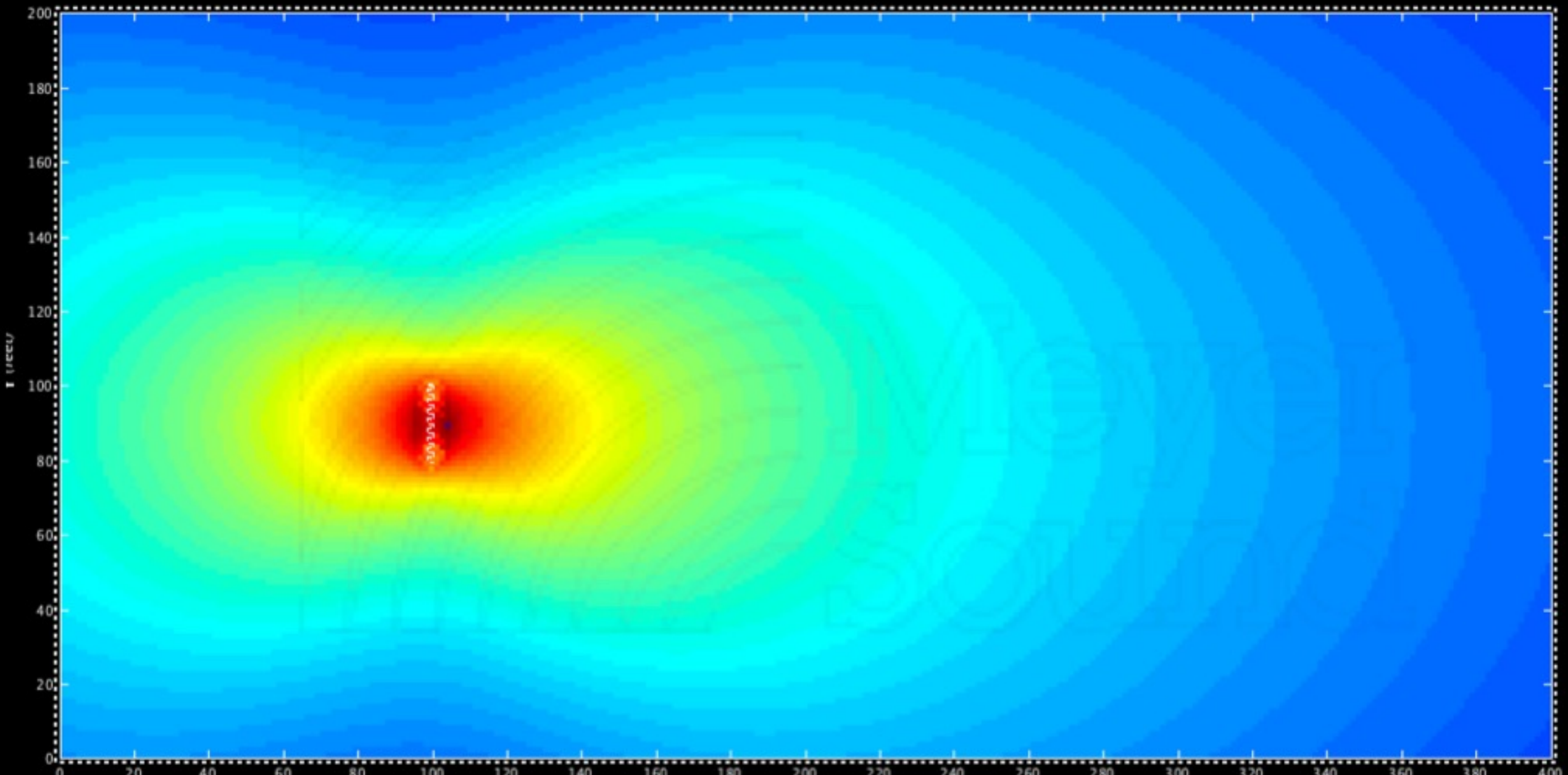
Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

8 USW 63Hz

Sound Field

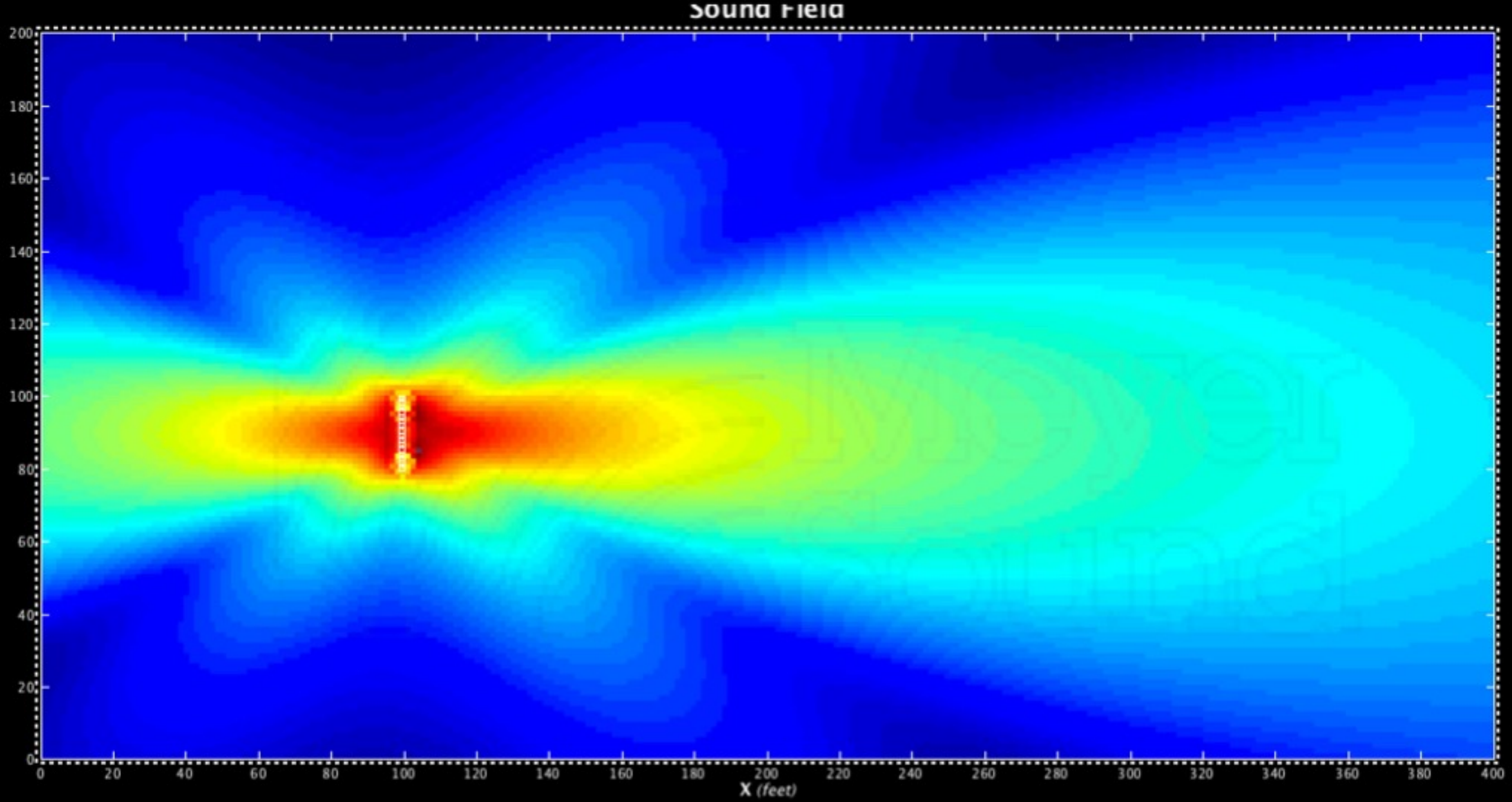


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 31.5 Hz
Start Frequency = 23.4 Hz
Stop Frequency = 45.4 Hz

Meyer Sound

8 USW 31.5Hz



Meyer Sound

Air Attenuation On
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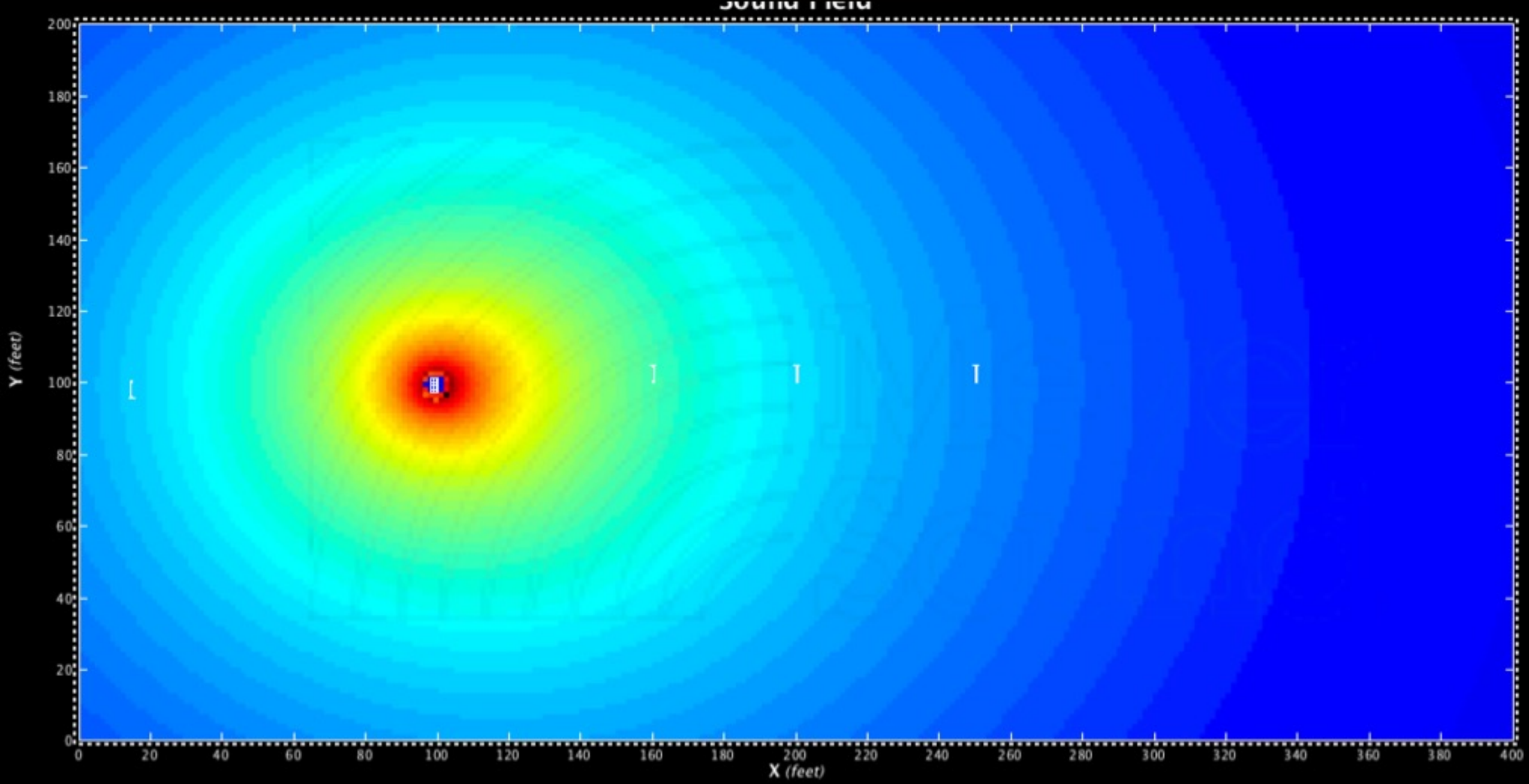
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 125 Hz
Start Frequency = 89.4 Hz
Stop Frequency = 178.7 Hz

8 USW 125Hz

Sound Field

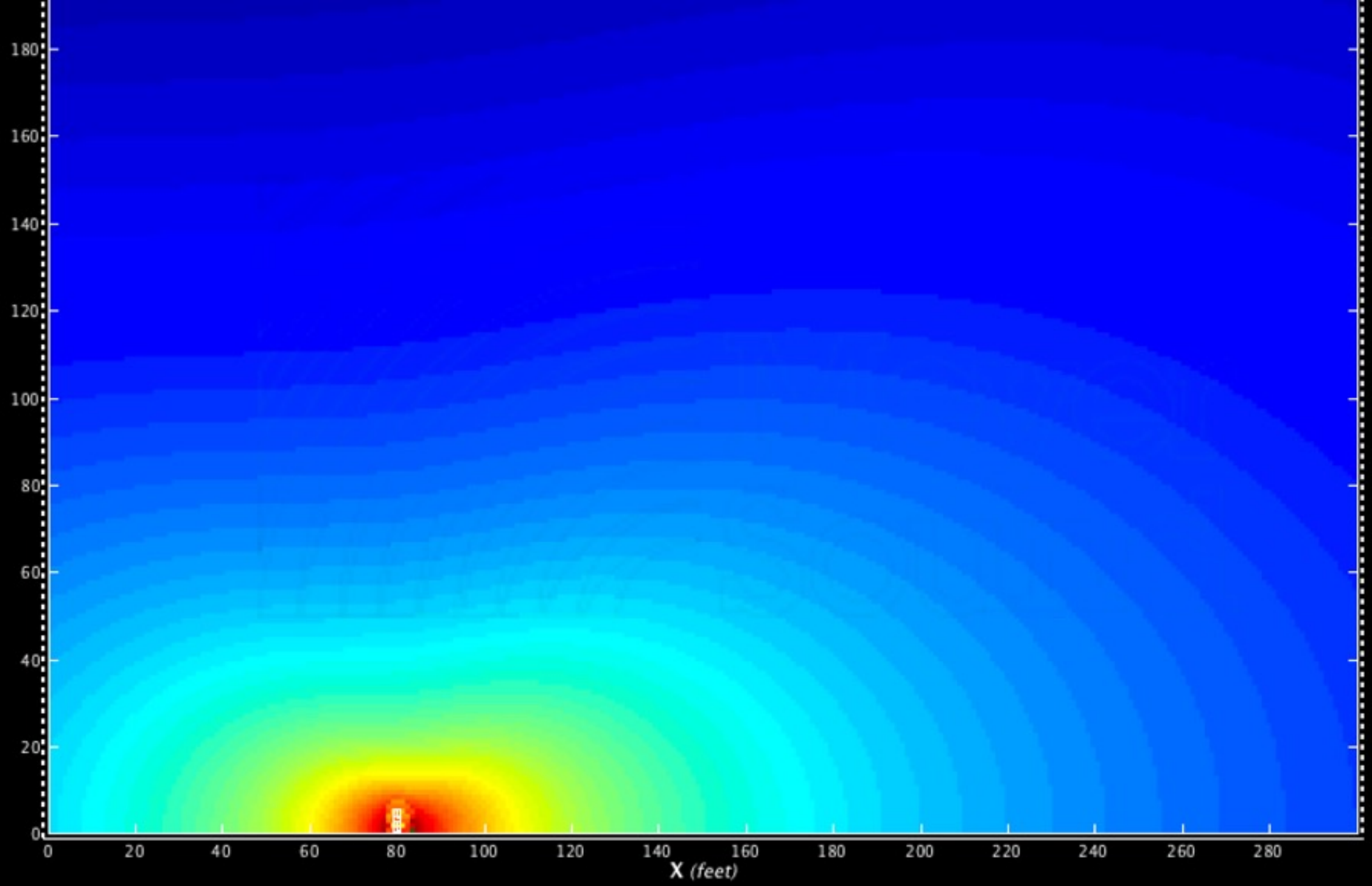


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

2 USW side by side 63Hz

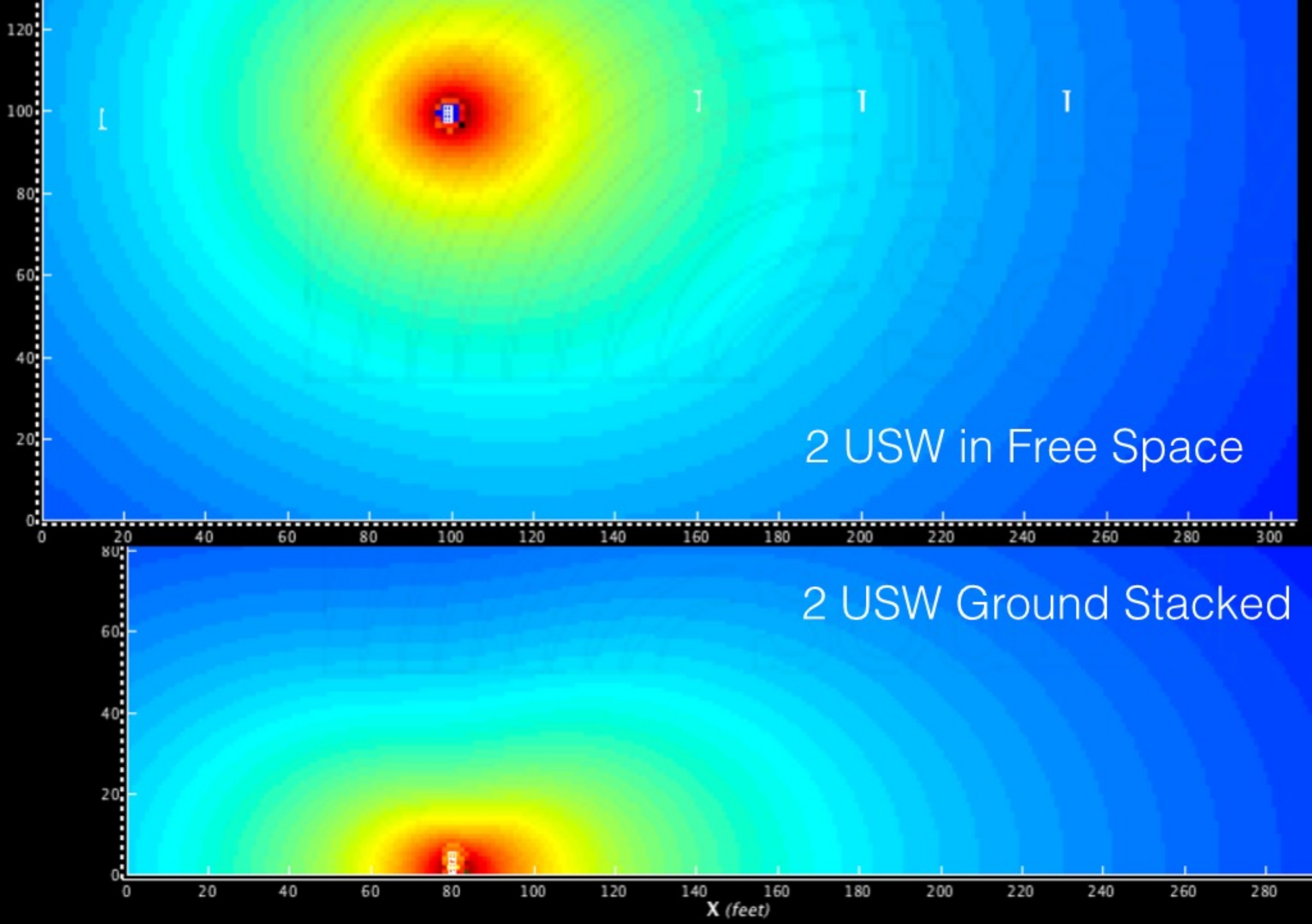


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

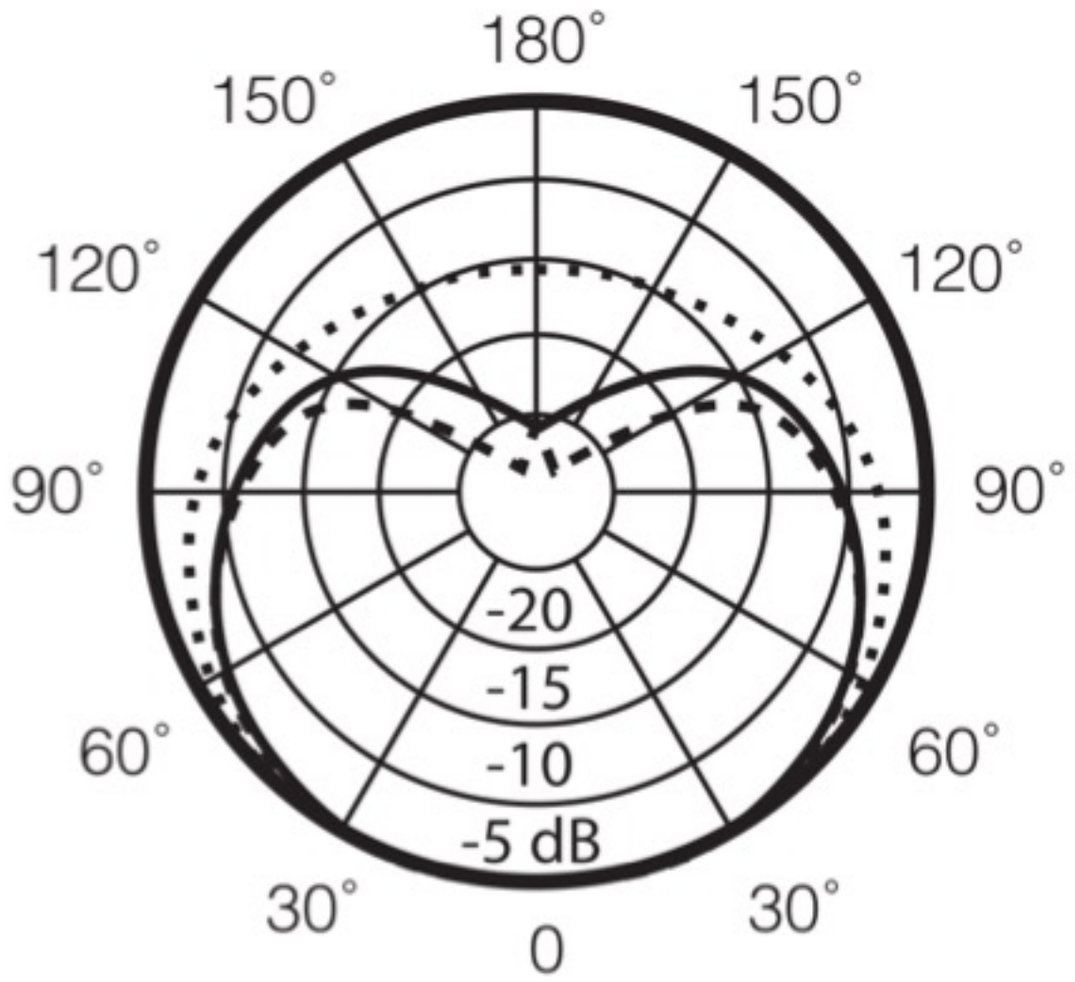
Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

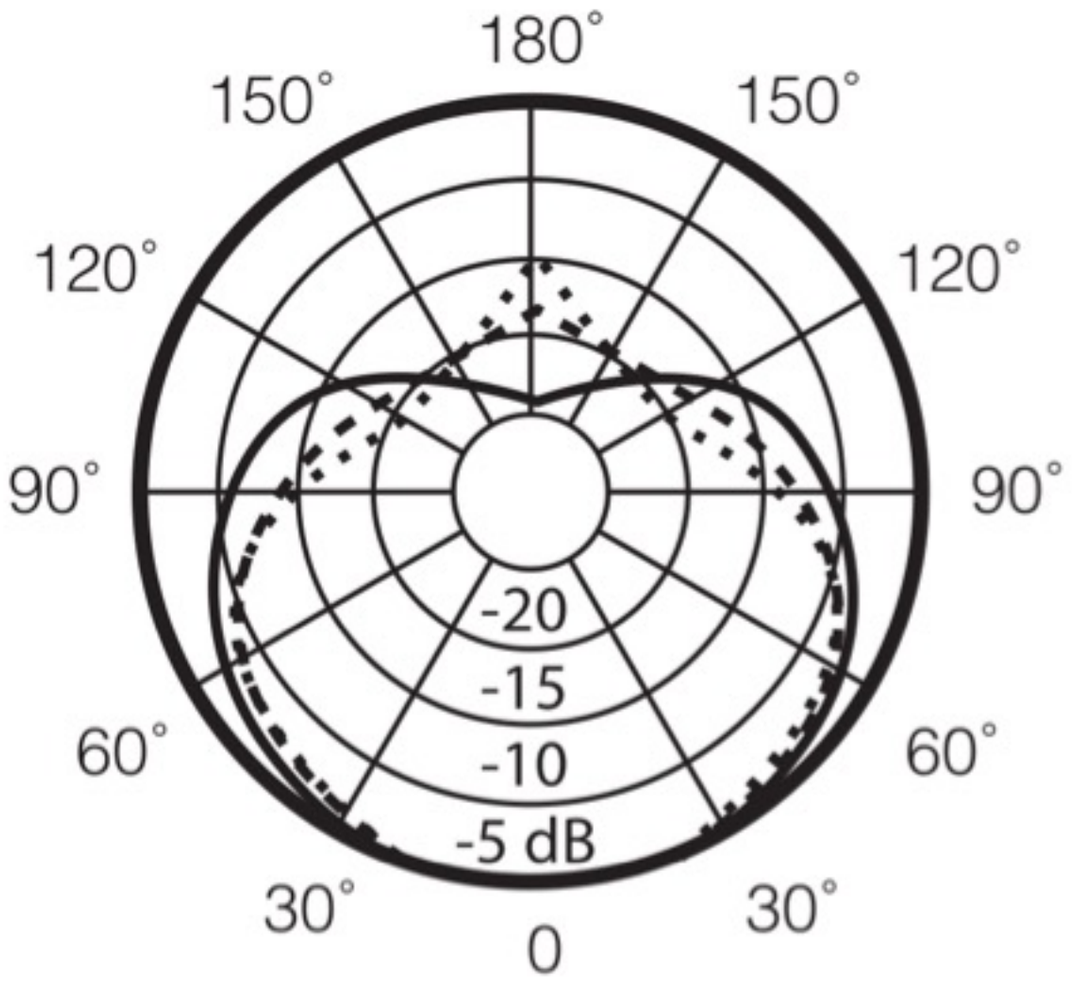
Meyer Sound

2 USW Ground Stacked 63Hz


2 USW in Free Space
2 USW Ground Stacked
X (feet)
Air Attenuation On
Temperature = 68.0°F

Cardioid





——— 125 Hz
····· 500 Hz
- - - - - - - 1000 Hz

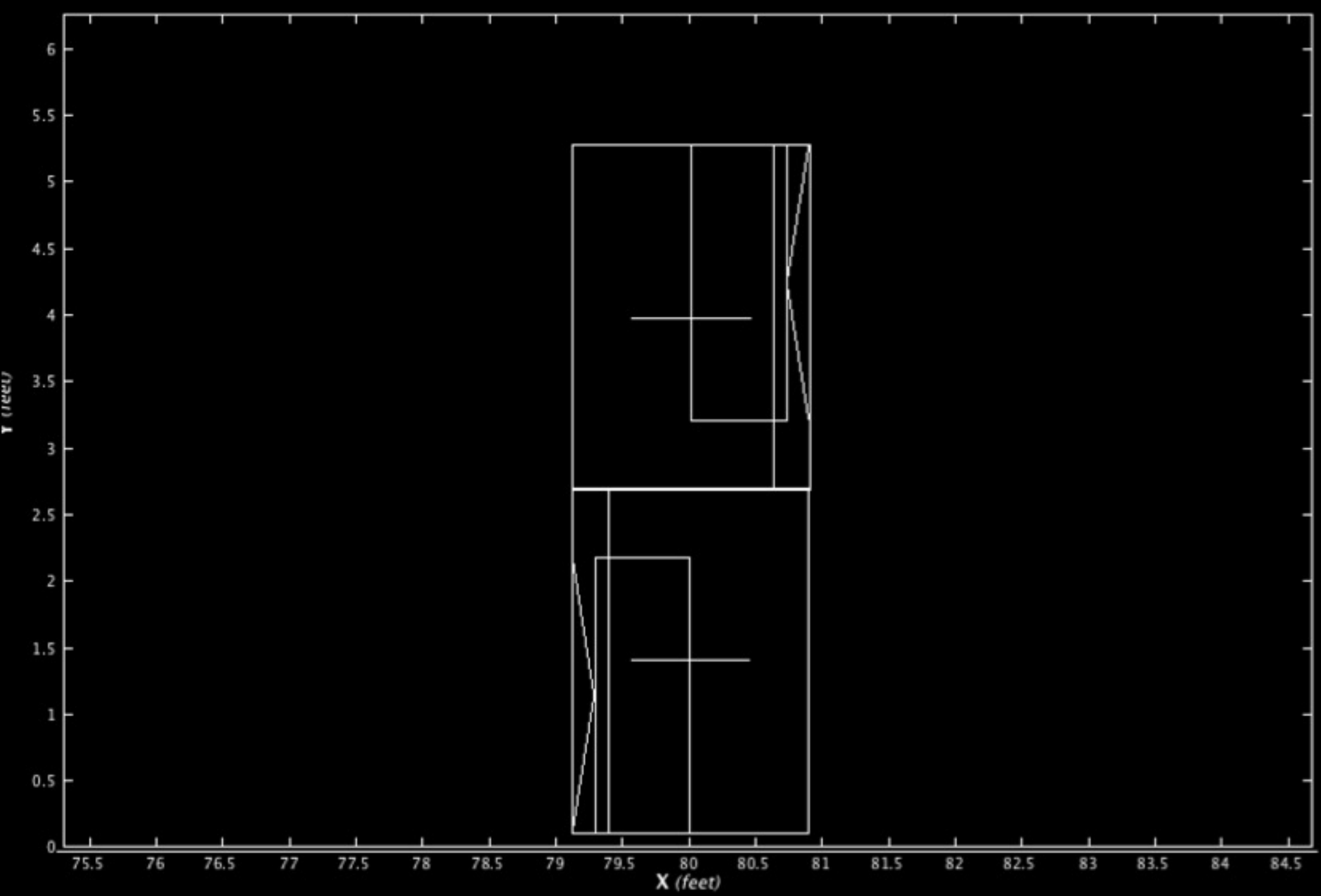
——— 2000 Hz
····· 4000 Hz
- - - - - - - 8000 Hz

Shure SM57 Cardioid Polar Pattern

Speed of Sound:

1125 feet per second
@ Sea Level
@68 degrees F
“Dry Air”

= 1.125’/ms



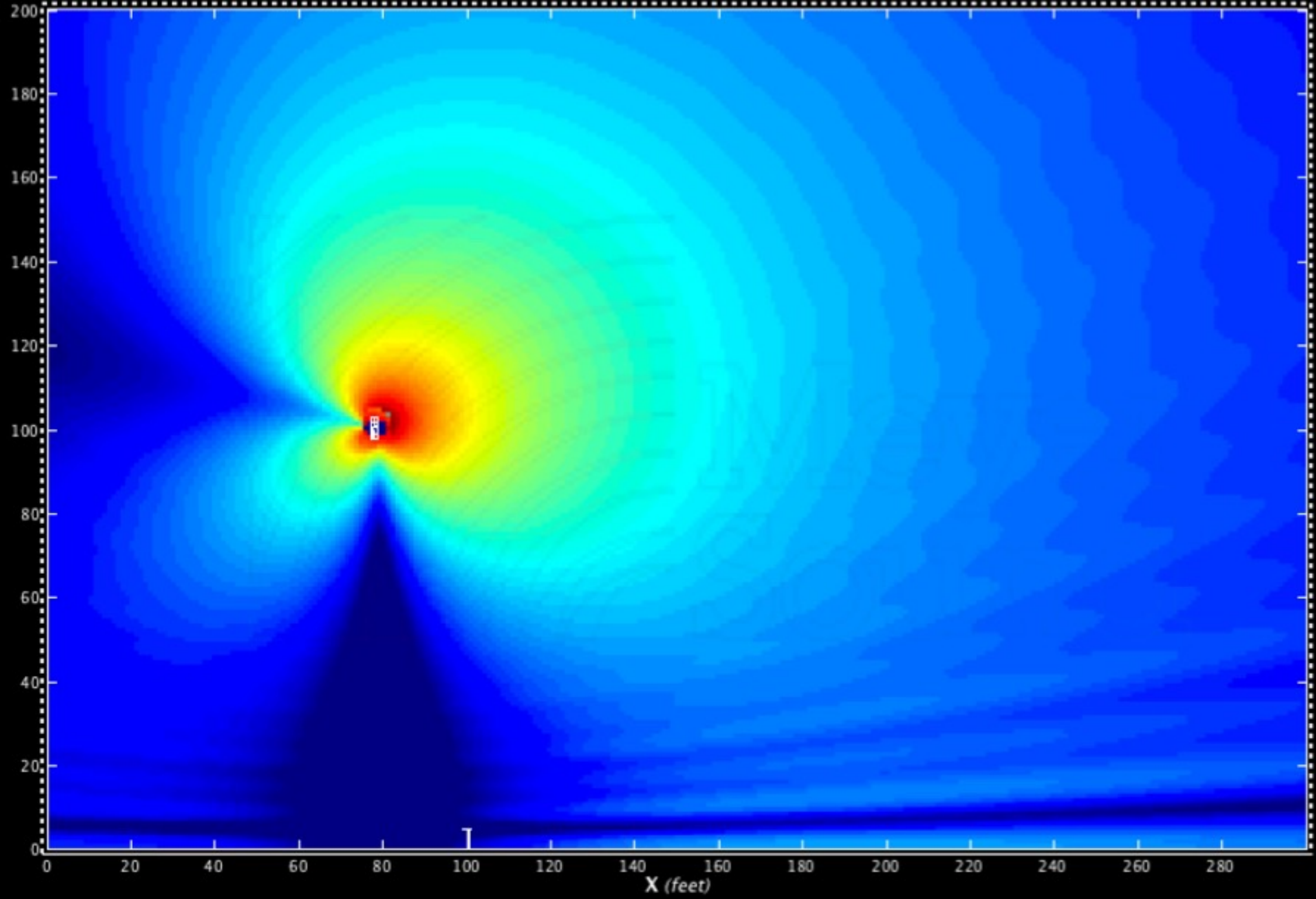
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 31.5 Hz
Start Frequency = 29.3 Hz
Stop Frequency = 36.6 Hz

Meyer Sound

2 Cardioid USW

Bottom box polarity reversed, delayed relative to top box



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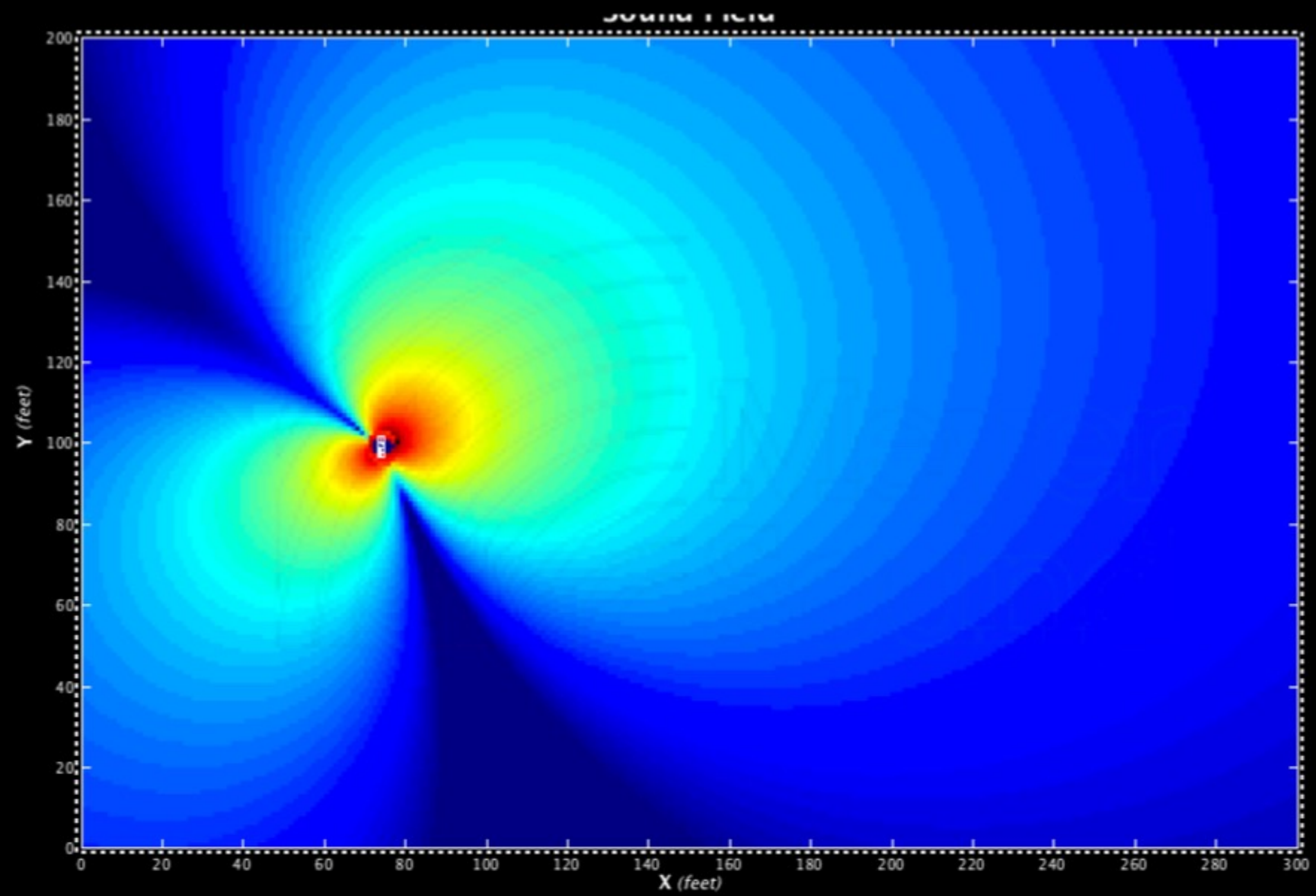
Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

Cardioid Perfect Measured 2.31ms

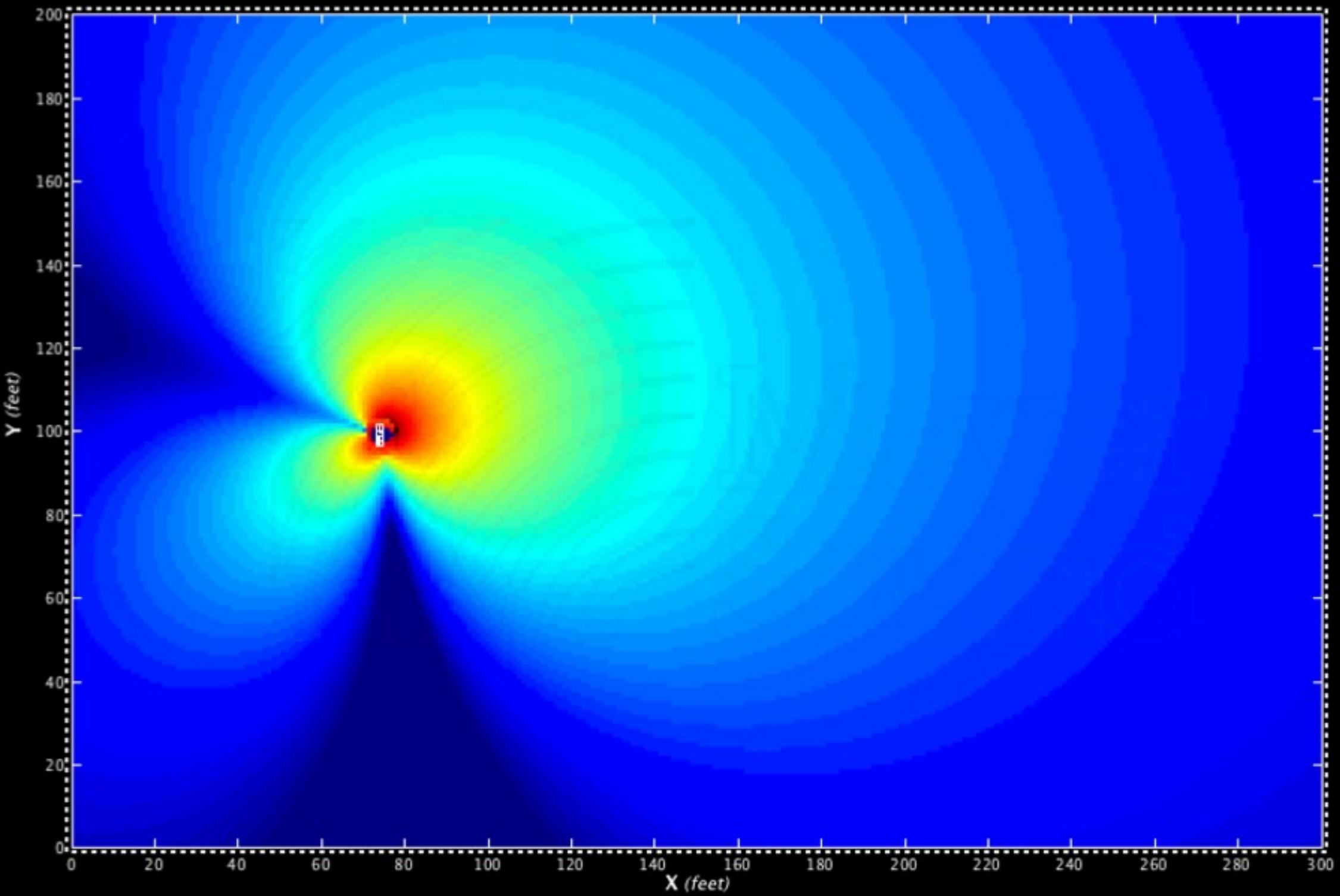


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Cardioid 63Hz 1ms

Sound Field



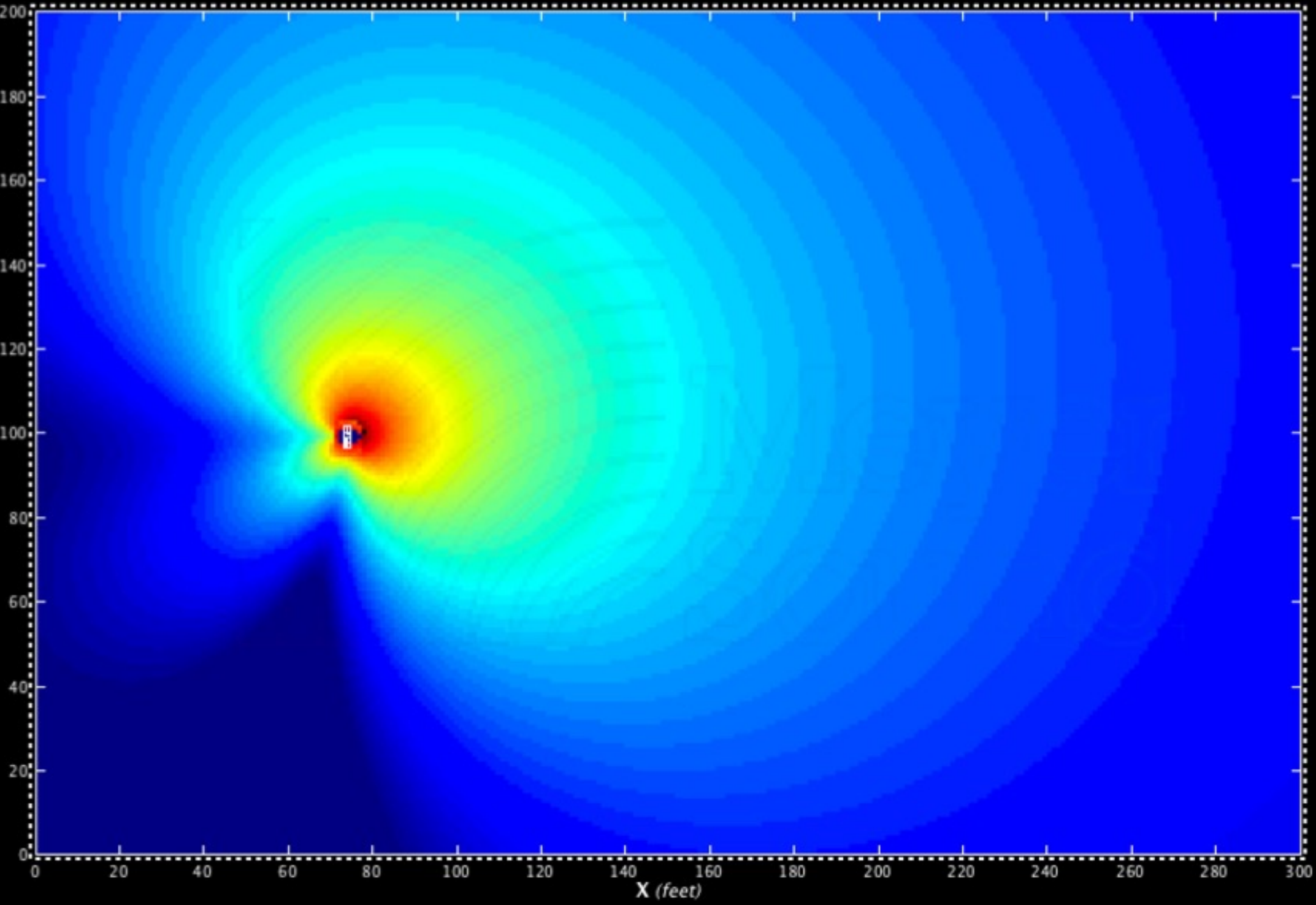
Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Cardioid 63Hz 2ms

Sound Field



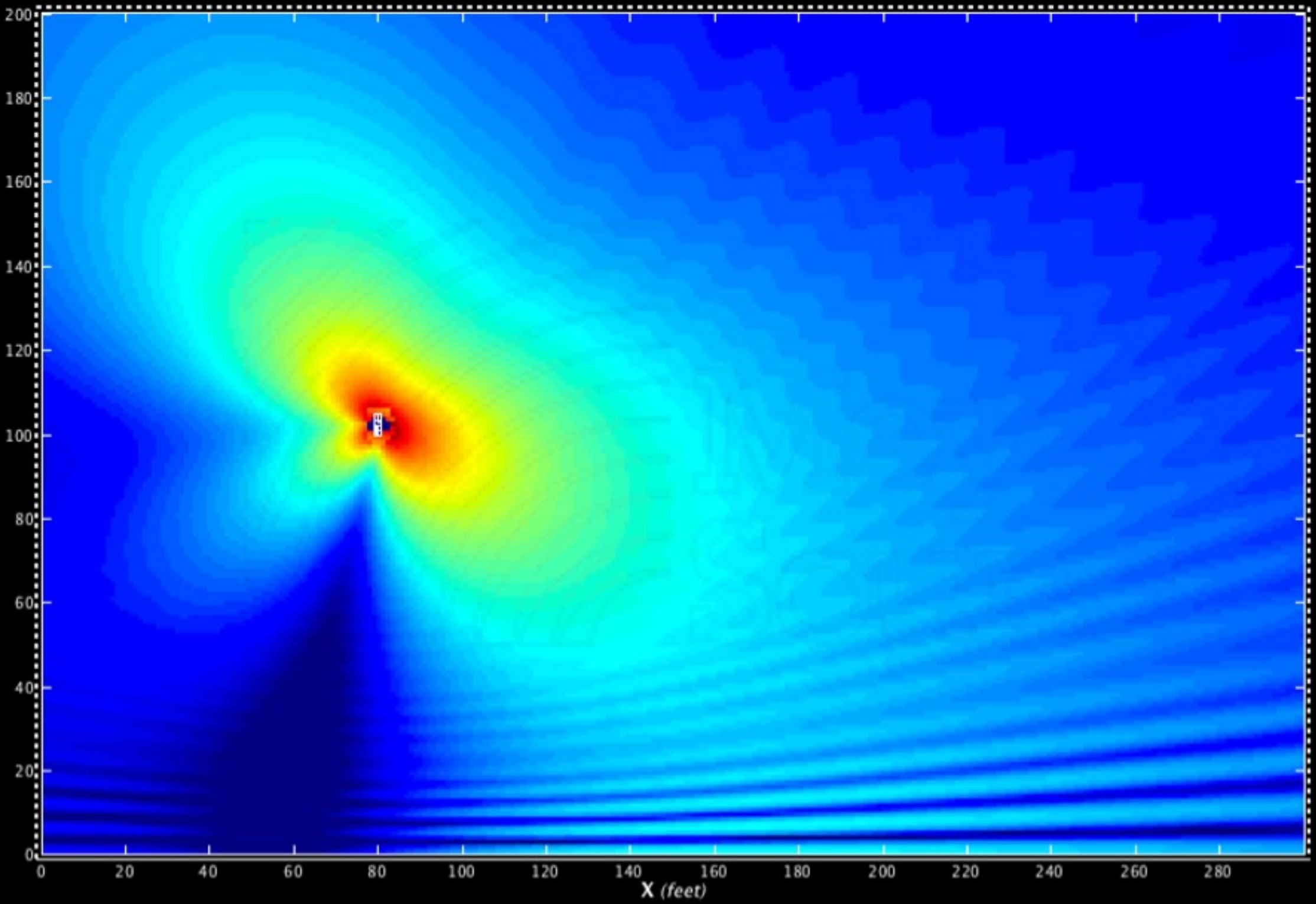
Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Cardioid 63Hz 3ms

Sound Field

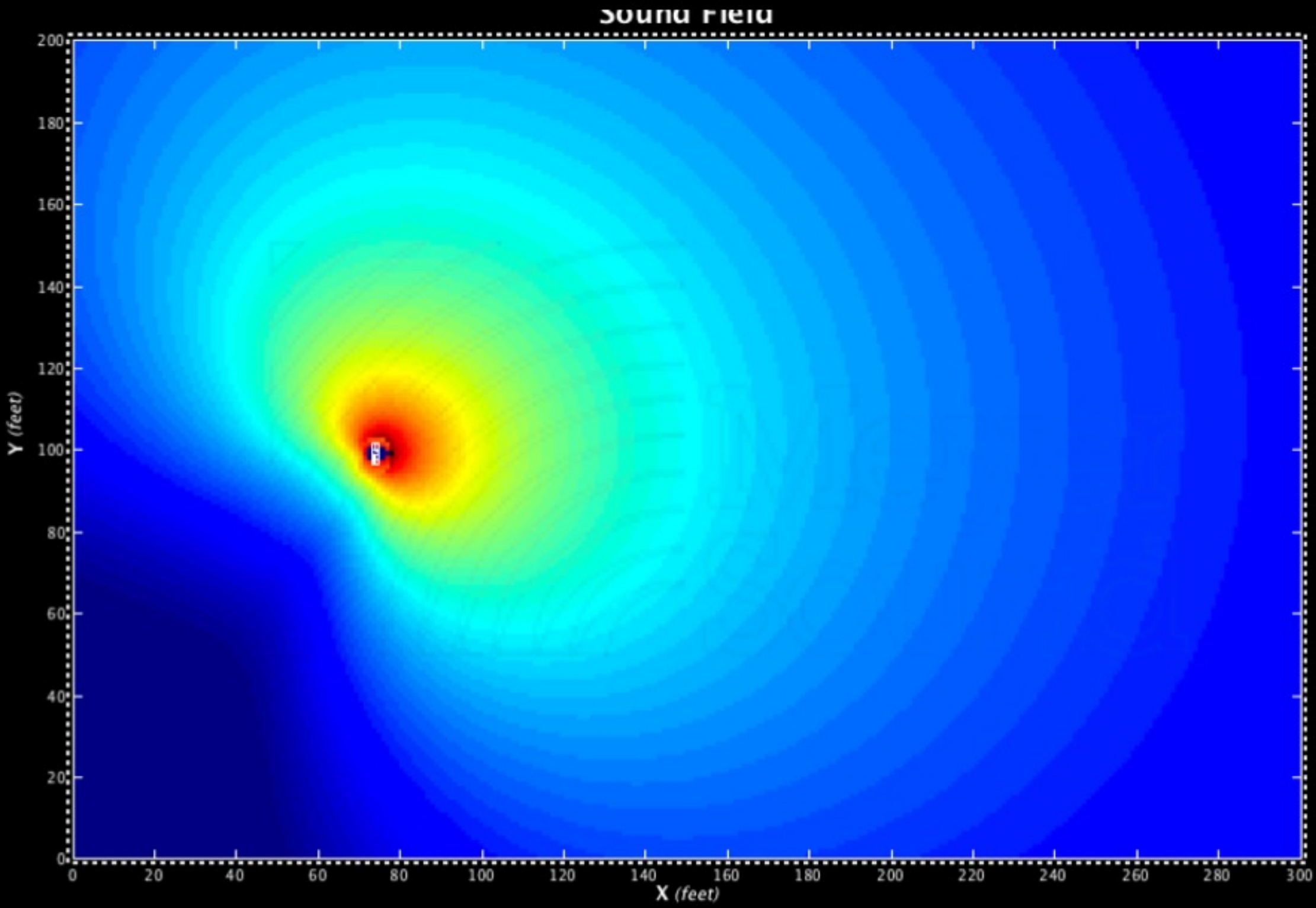


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 125 Hz
Start Frequency = 112.8 Hz
Stop Frequency = 140.6 Hz

Meyer Sound

Cardioid 125Hz 3ms

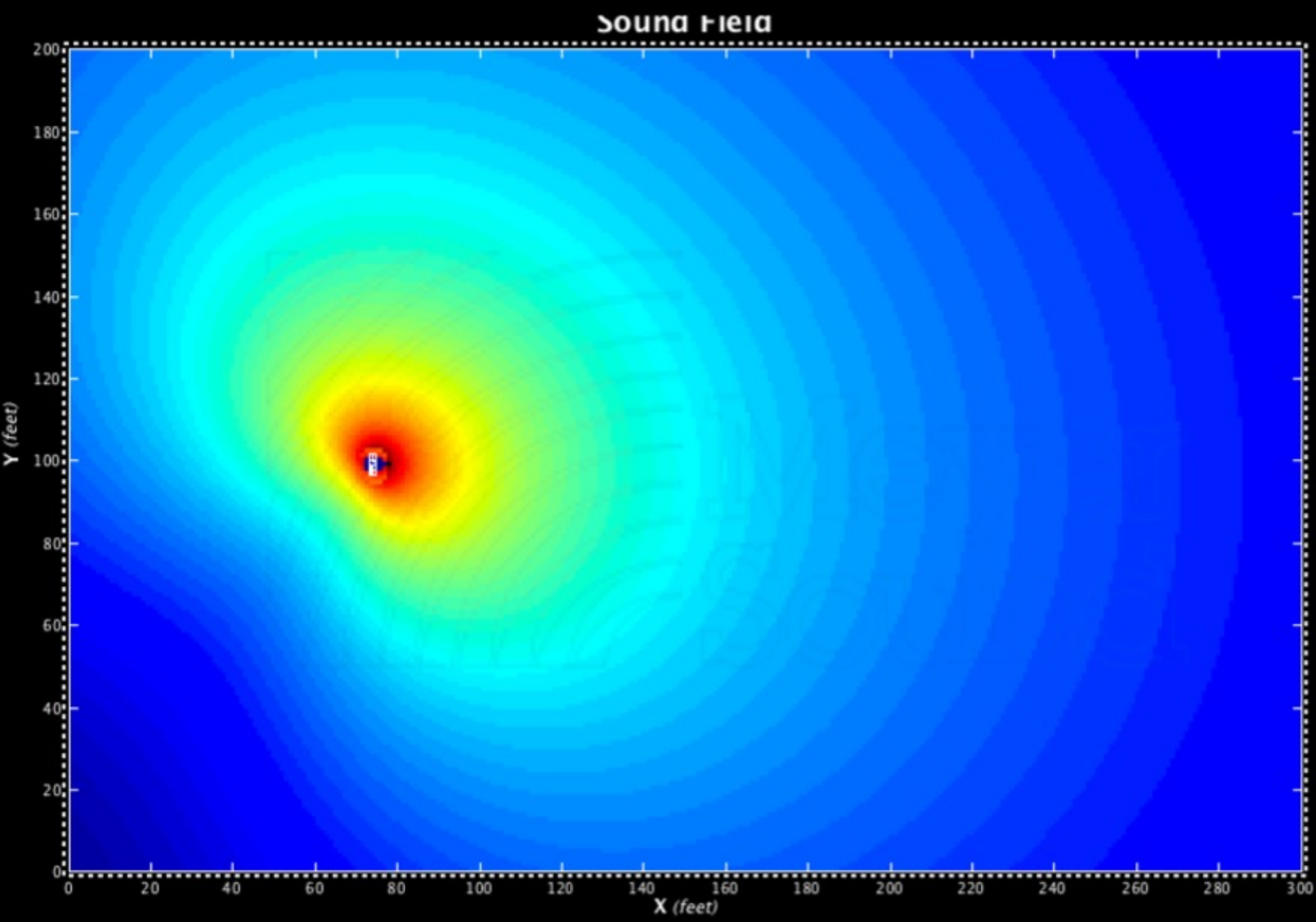


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

Cardioid 63 Hz 4ms



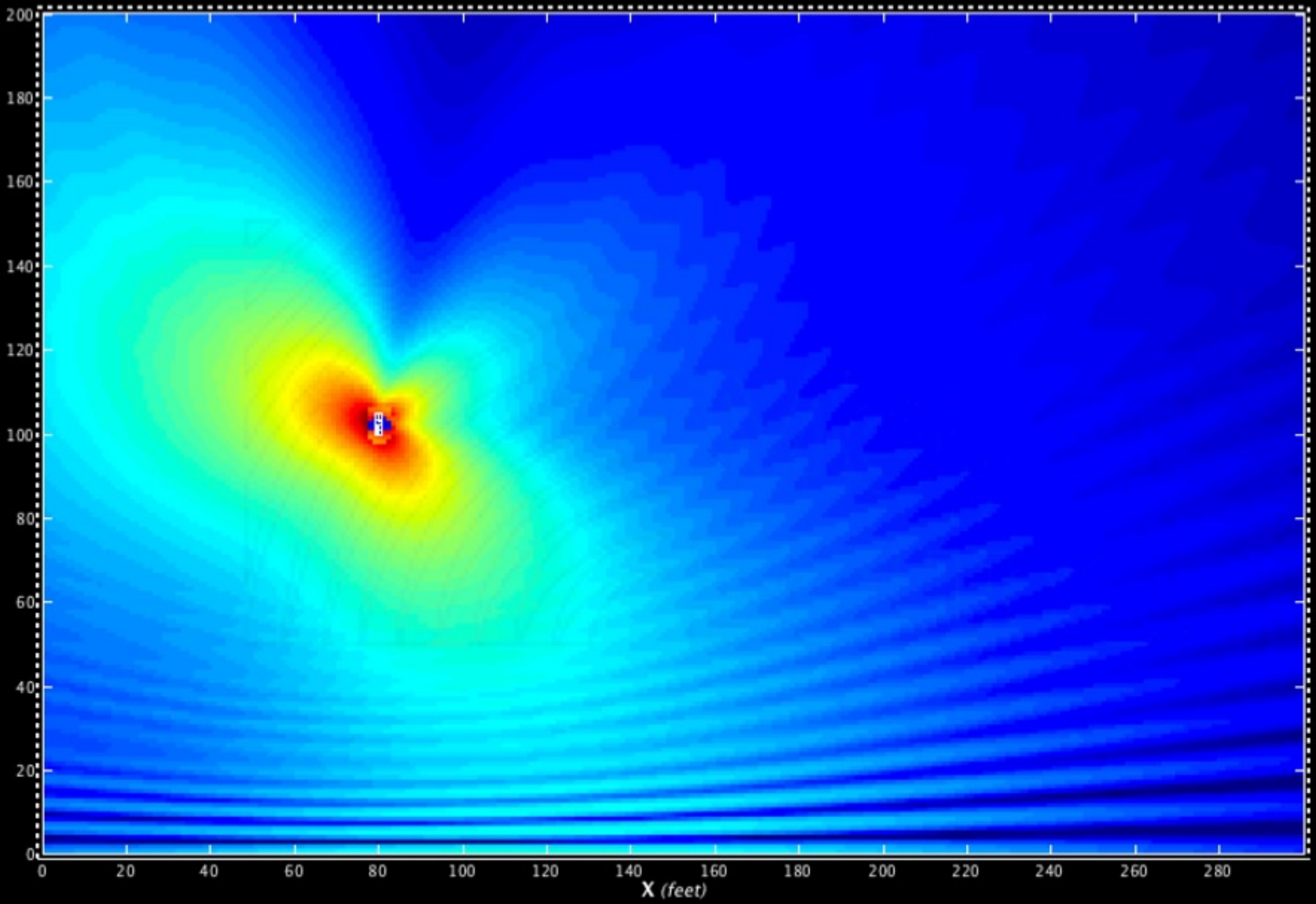
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

Cardioid 63 Hz 5ms

Sound Field



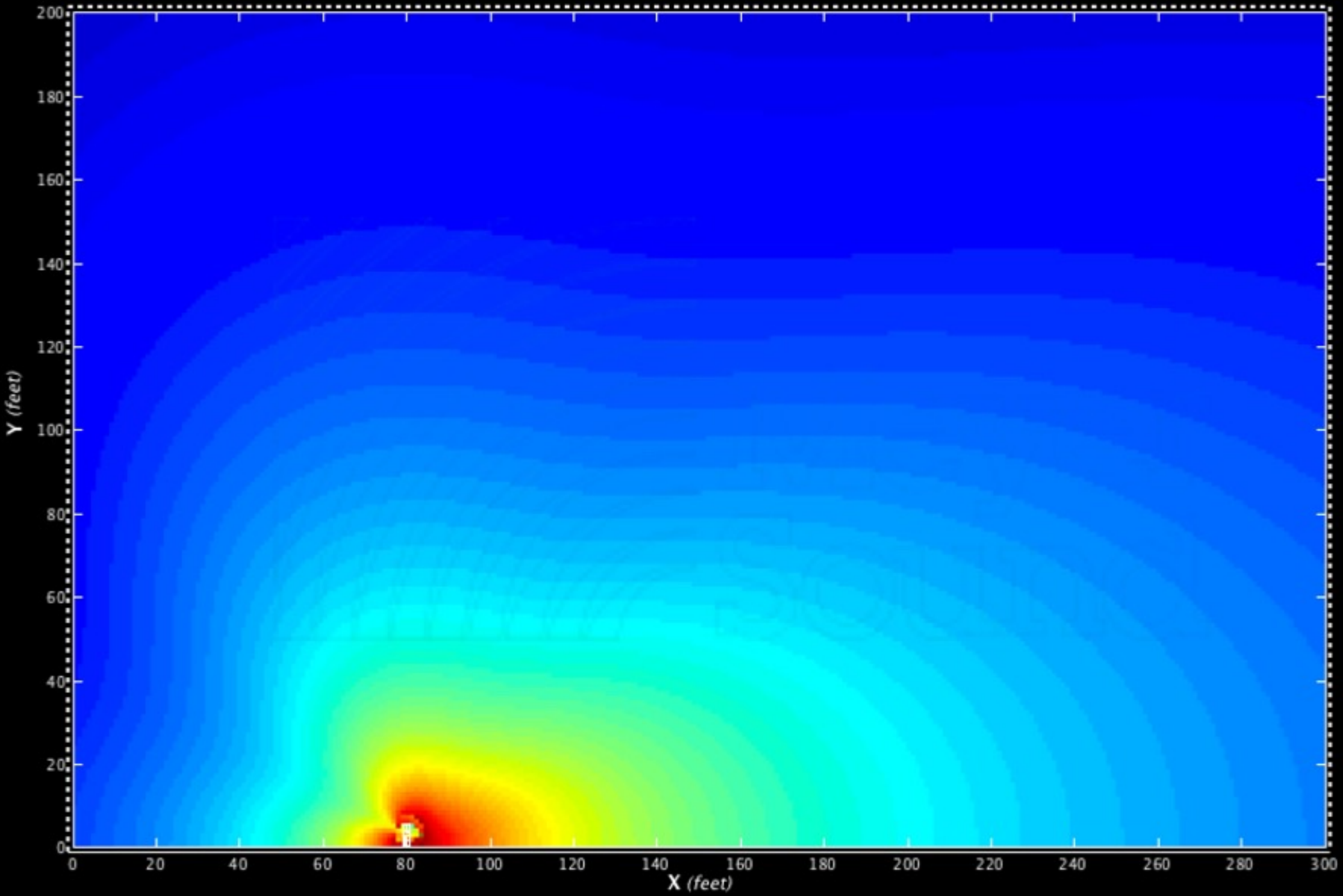
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 125 Hz
Start Frequency = 112.8 Hz
Stop Frequency = 140.6 Hz

Meyer Sound

Cardioid 125Hz 5ms

Sound Field

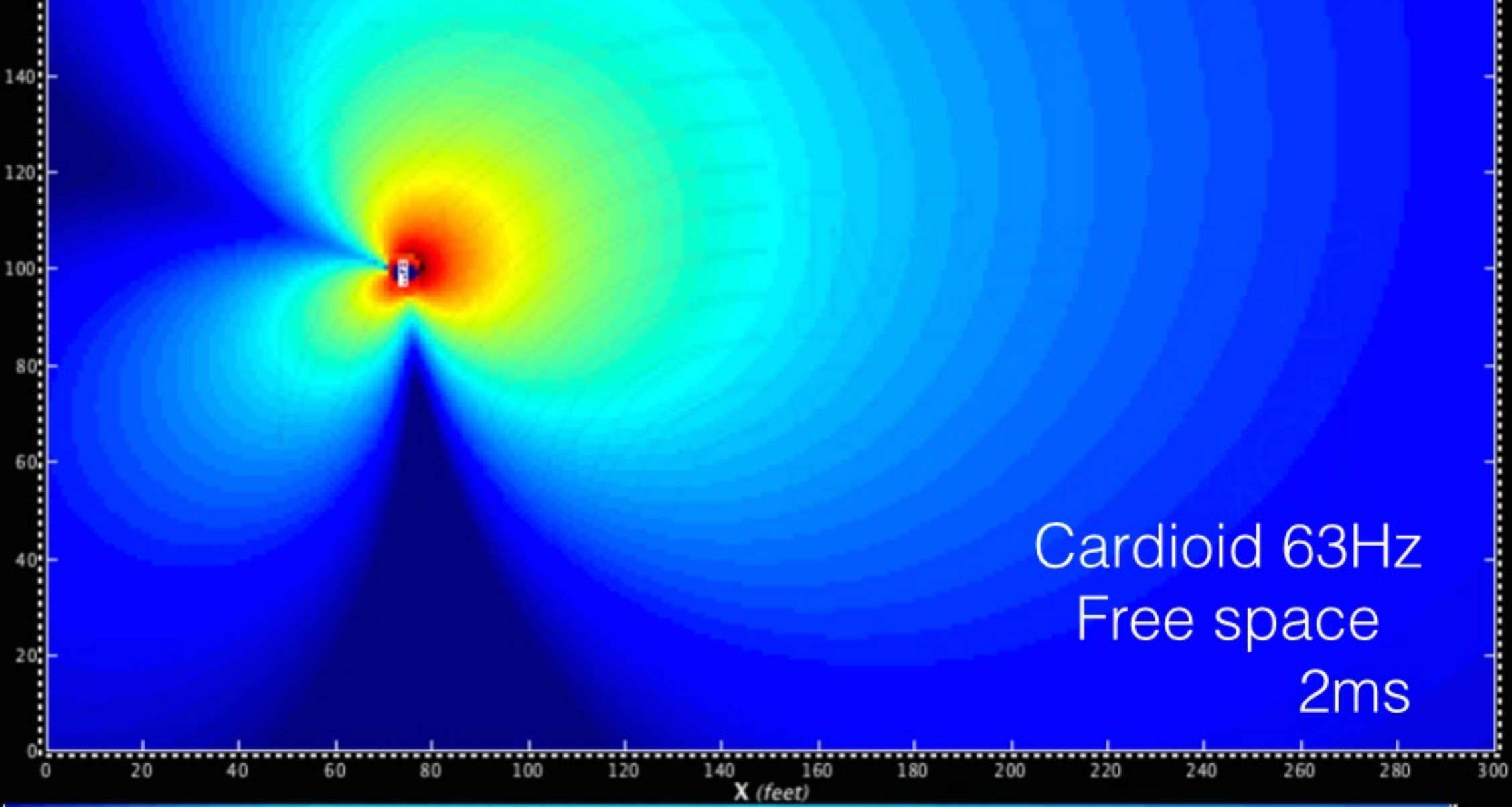


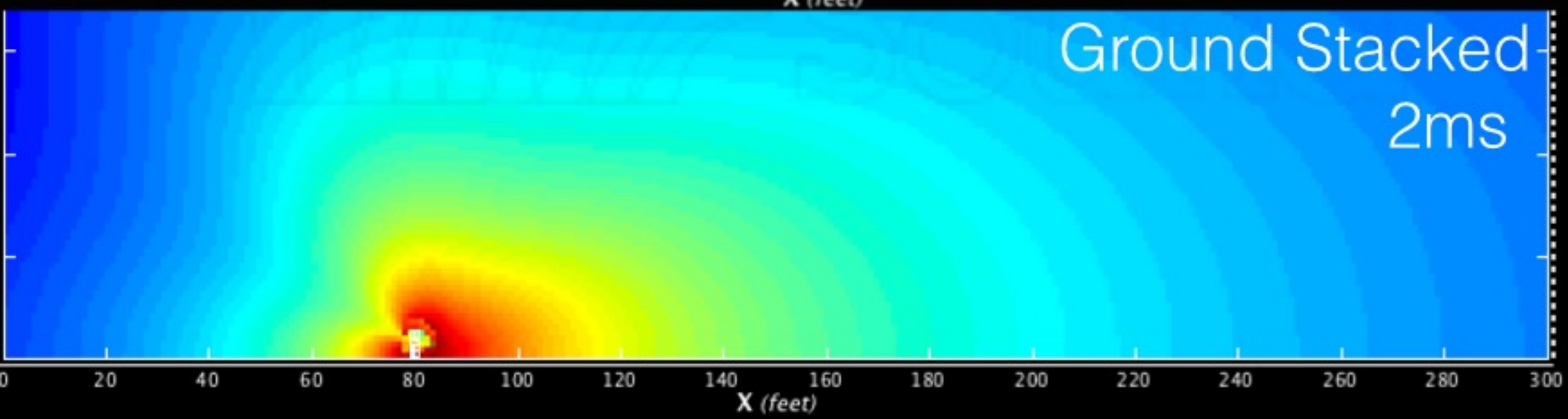
Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Cardioid Floor 63 Hz 2ms

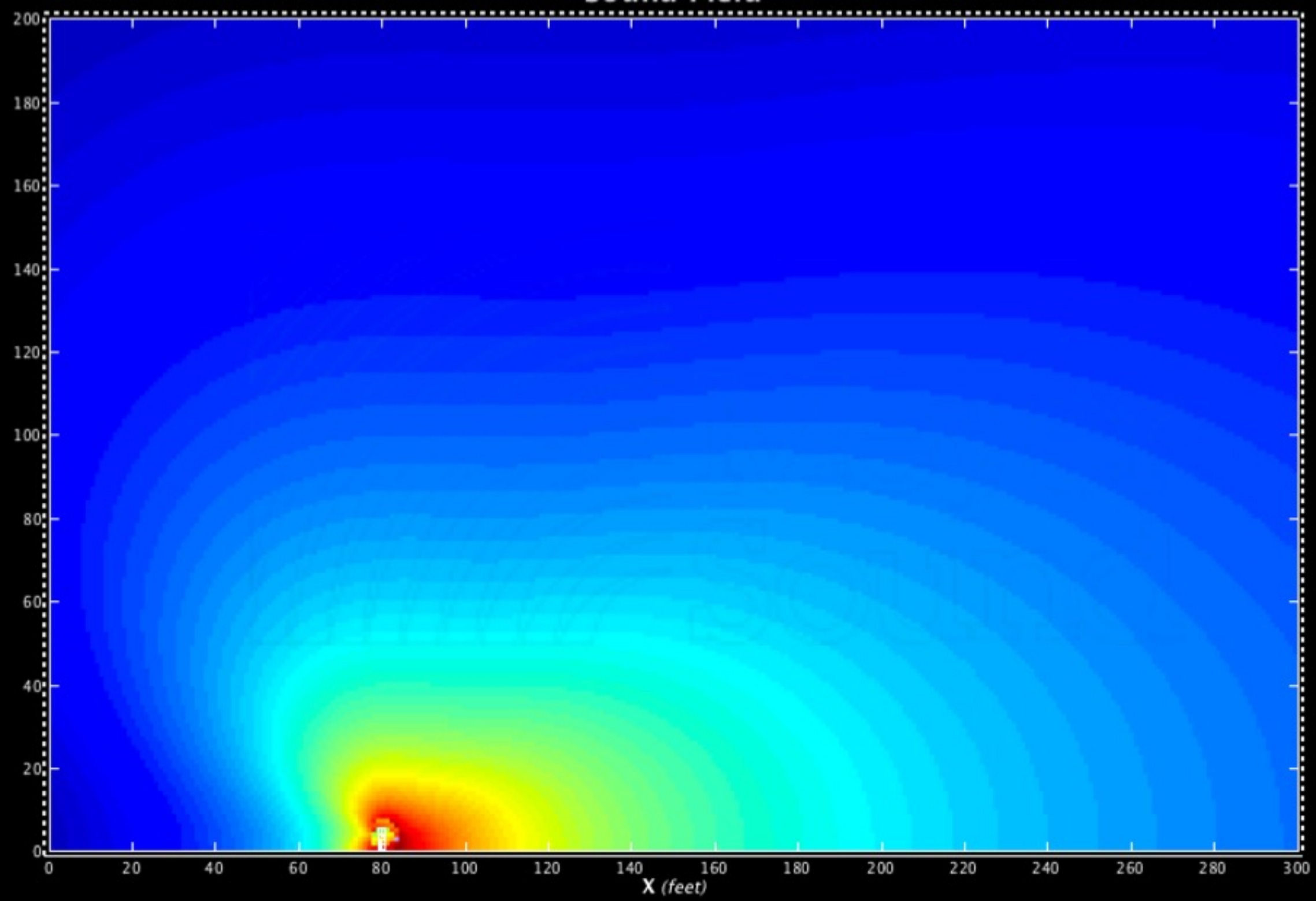




Meyer

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz

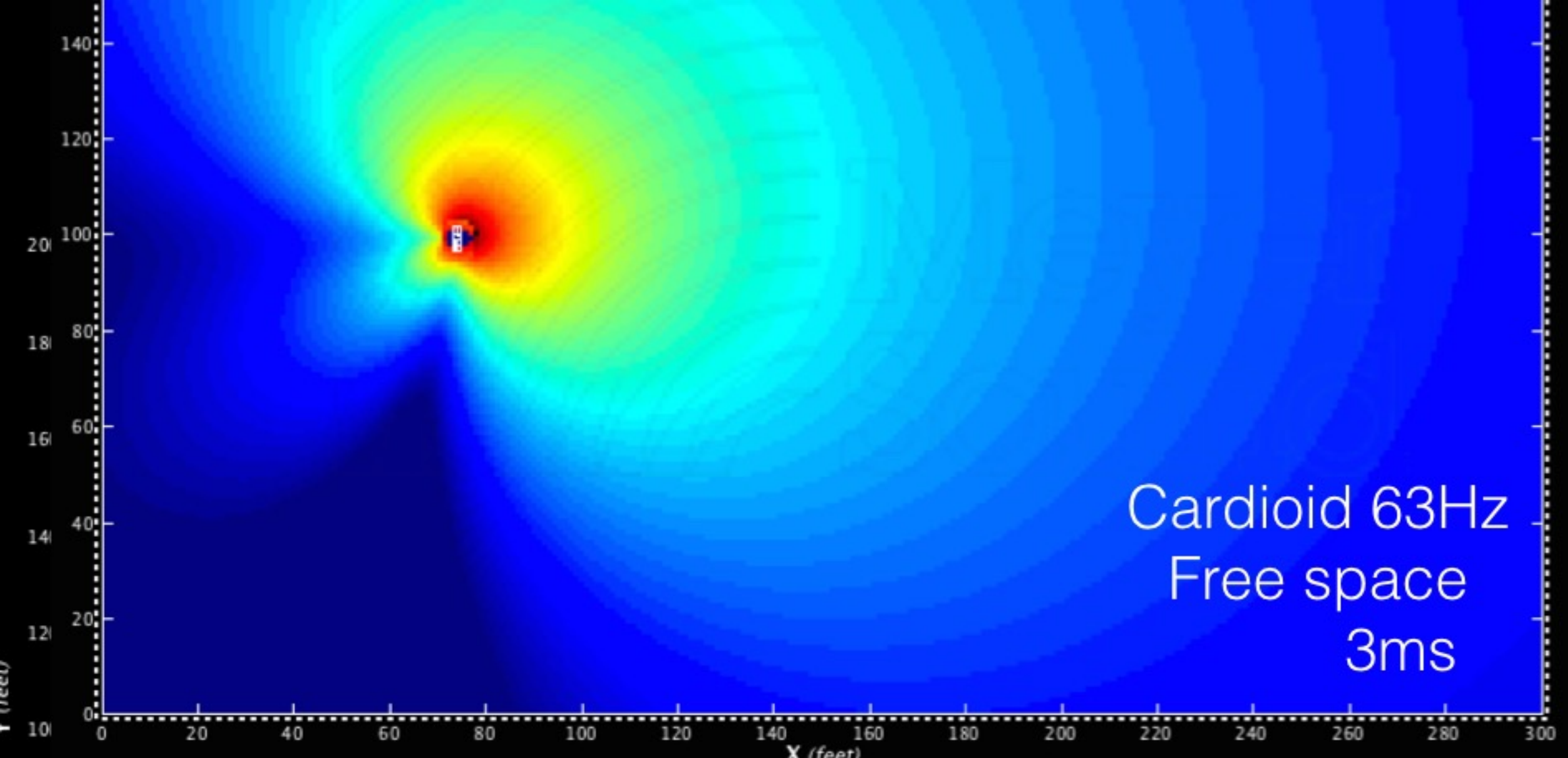


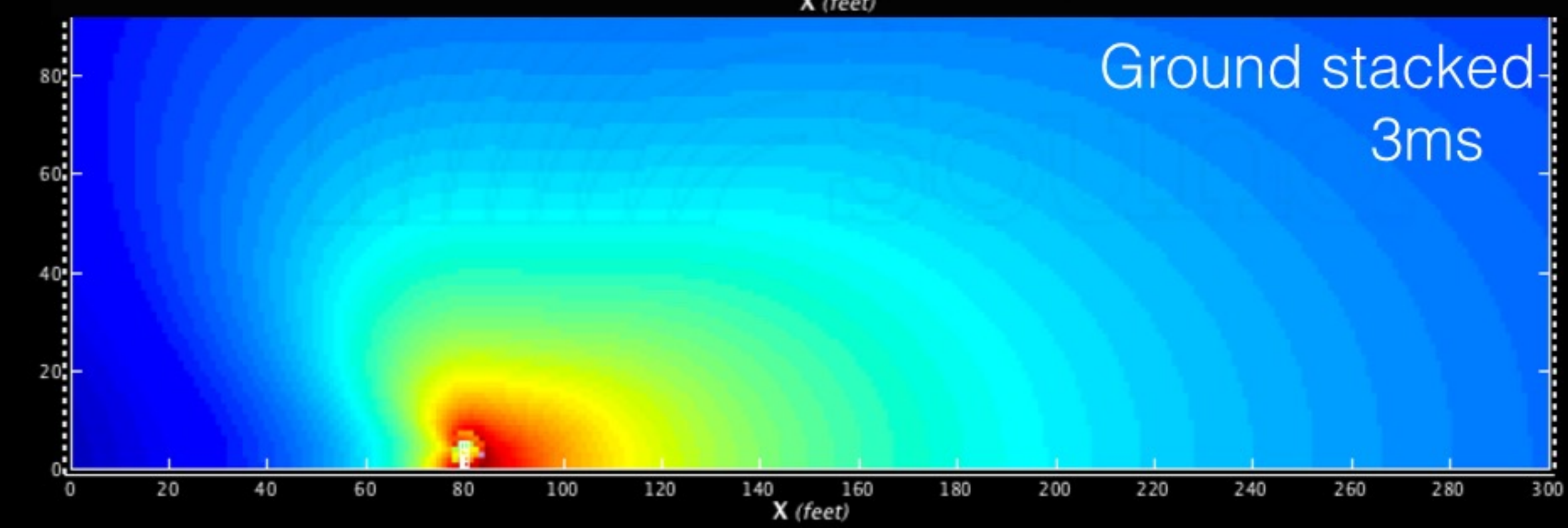
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

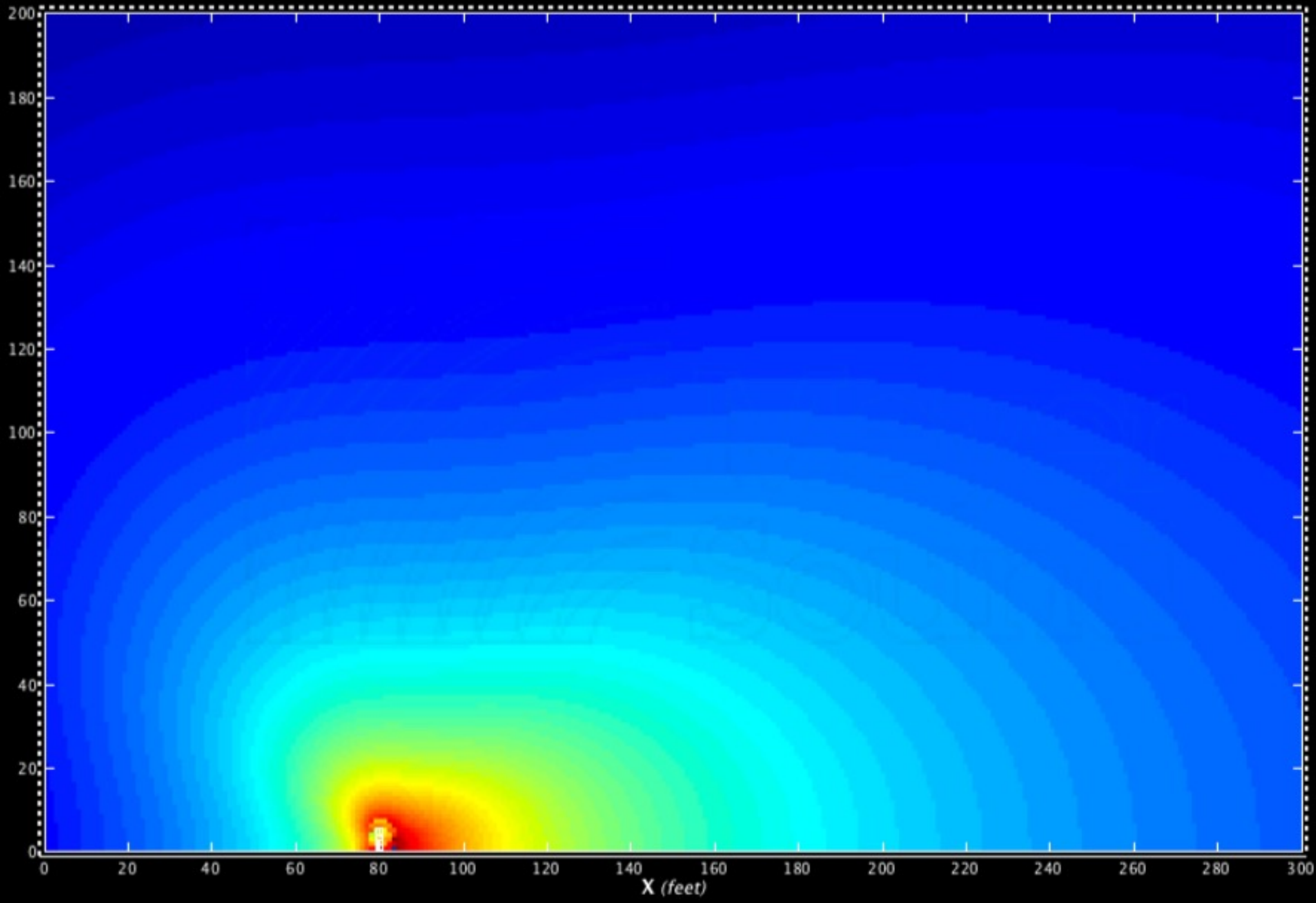
Meyer Sound

Cardioid Floor 63Hz 3ms


Cardioid 63Hz
Free space
3ms
X (feet)


Ground stacked
3ms
X (feet)

Sound Field

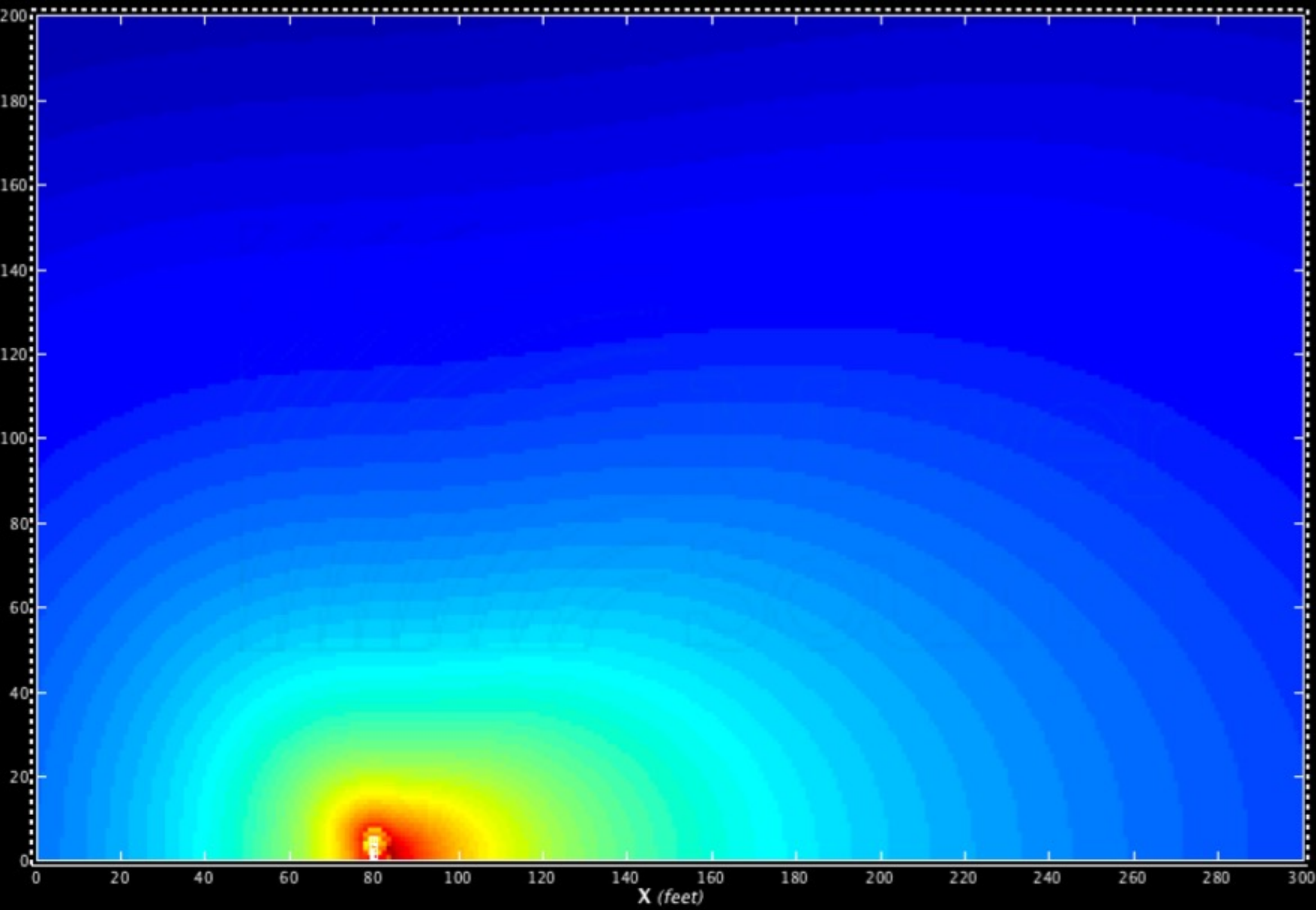


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

Cardioid 63Hz 4ms

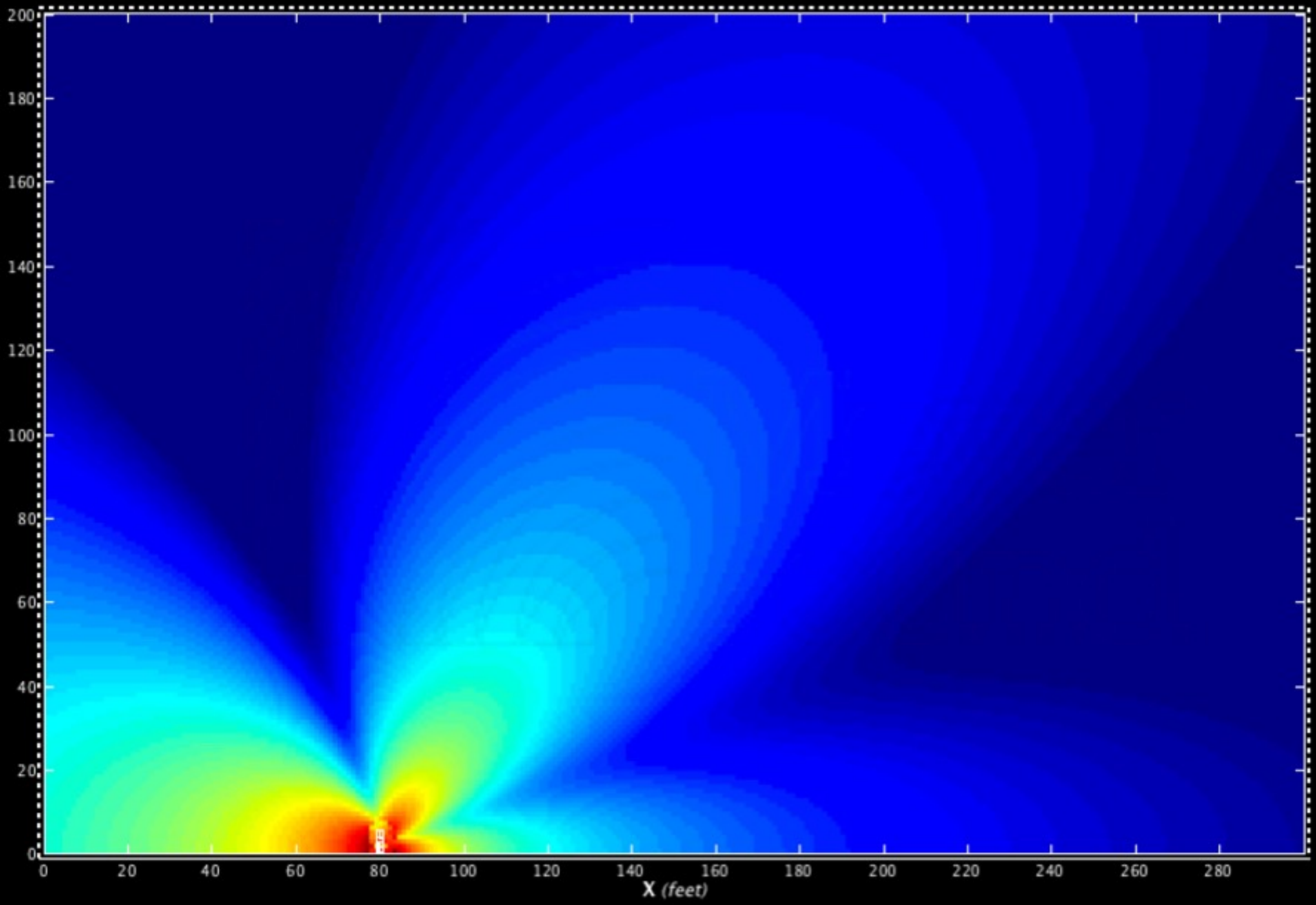


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

Cardioid 63Hz 5ms

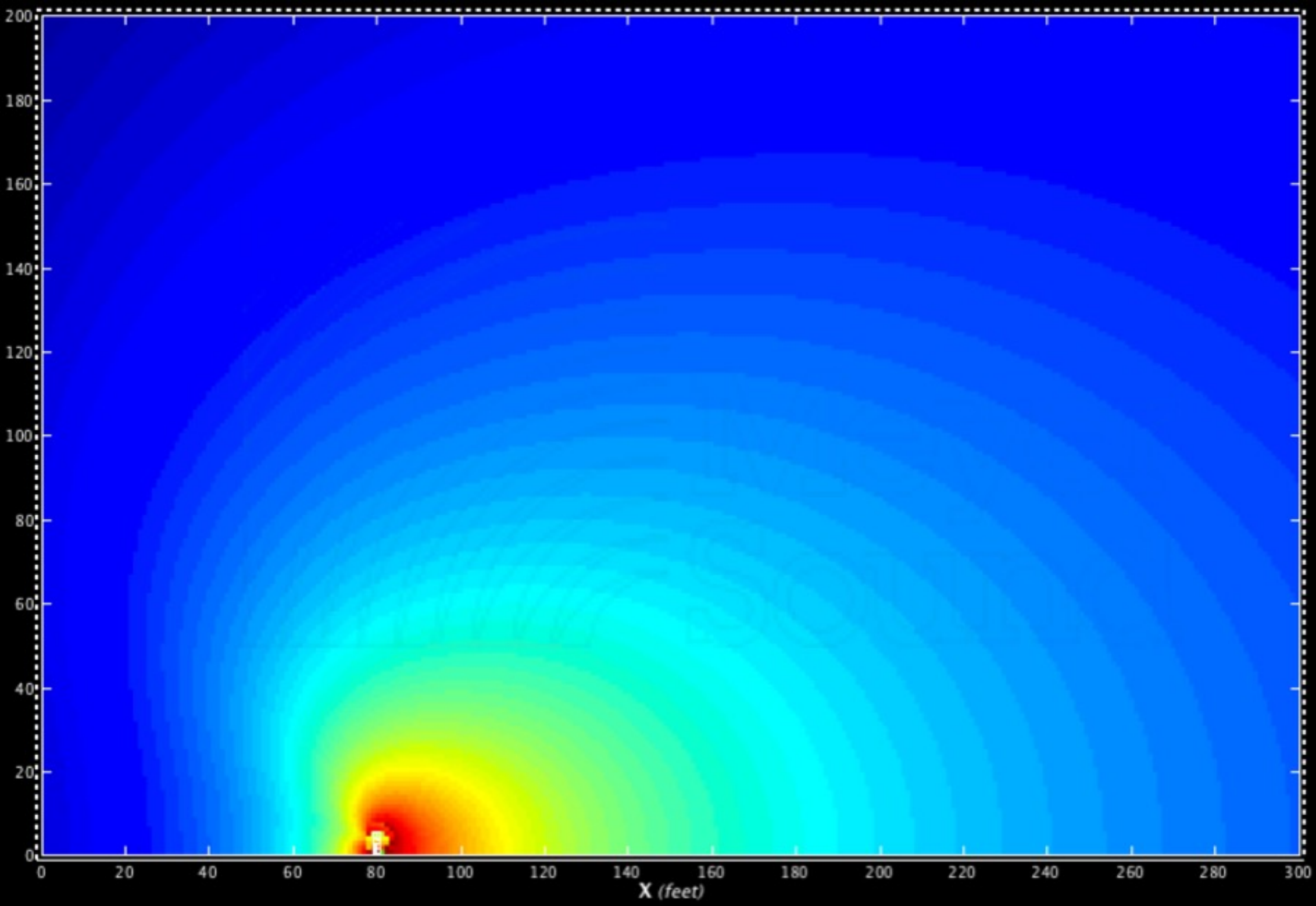


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 125 Hz
Start Frequency = 112.8 Hz
Stop Frequency = 140.6 Hz

Meyer Sound

Cardioid 125Hz 5ms

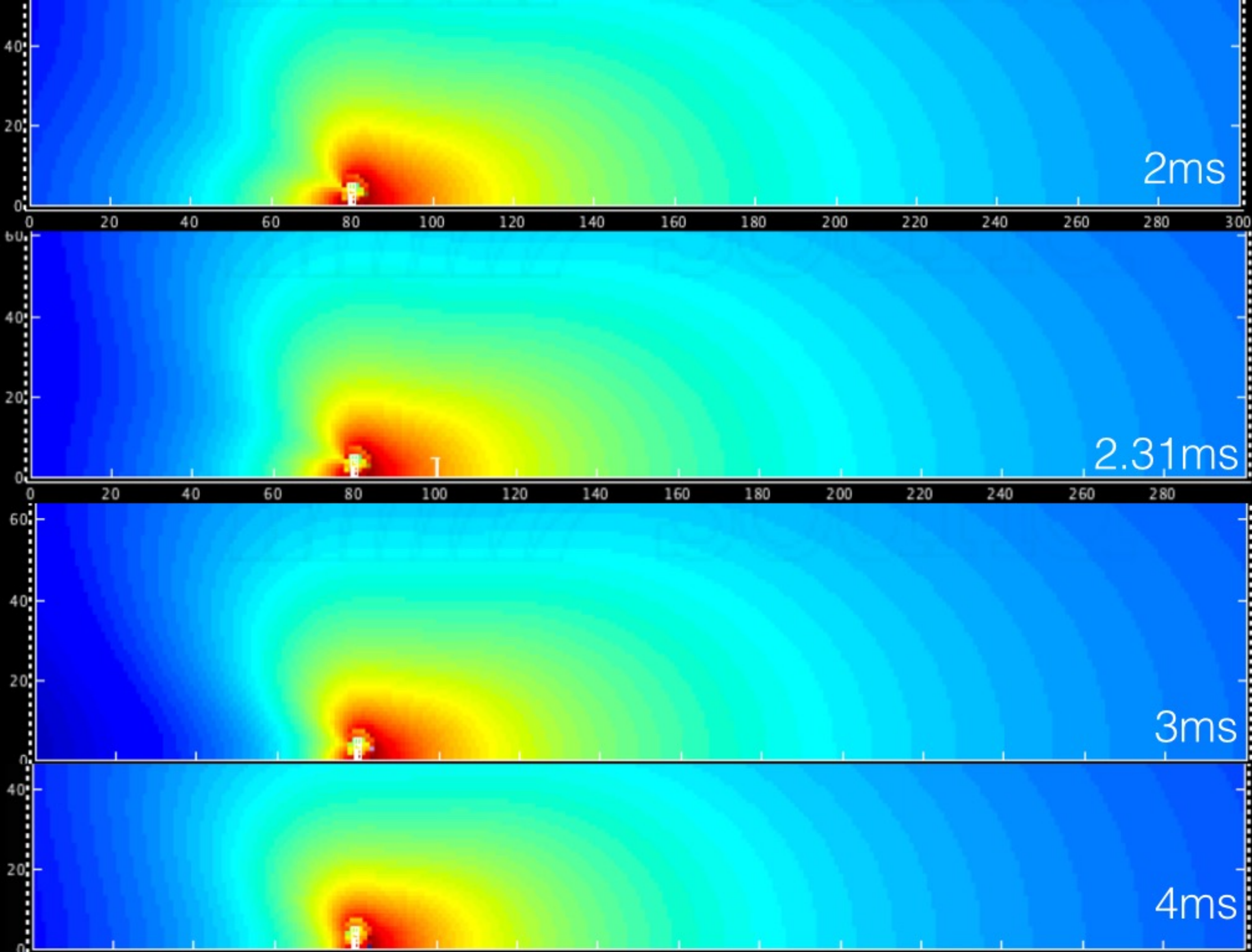


Meyer Sound

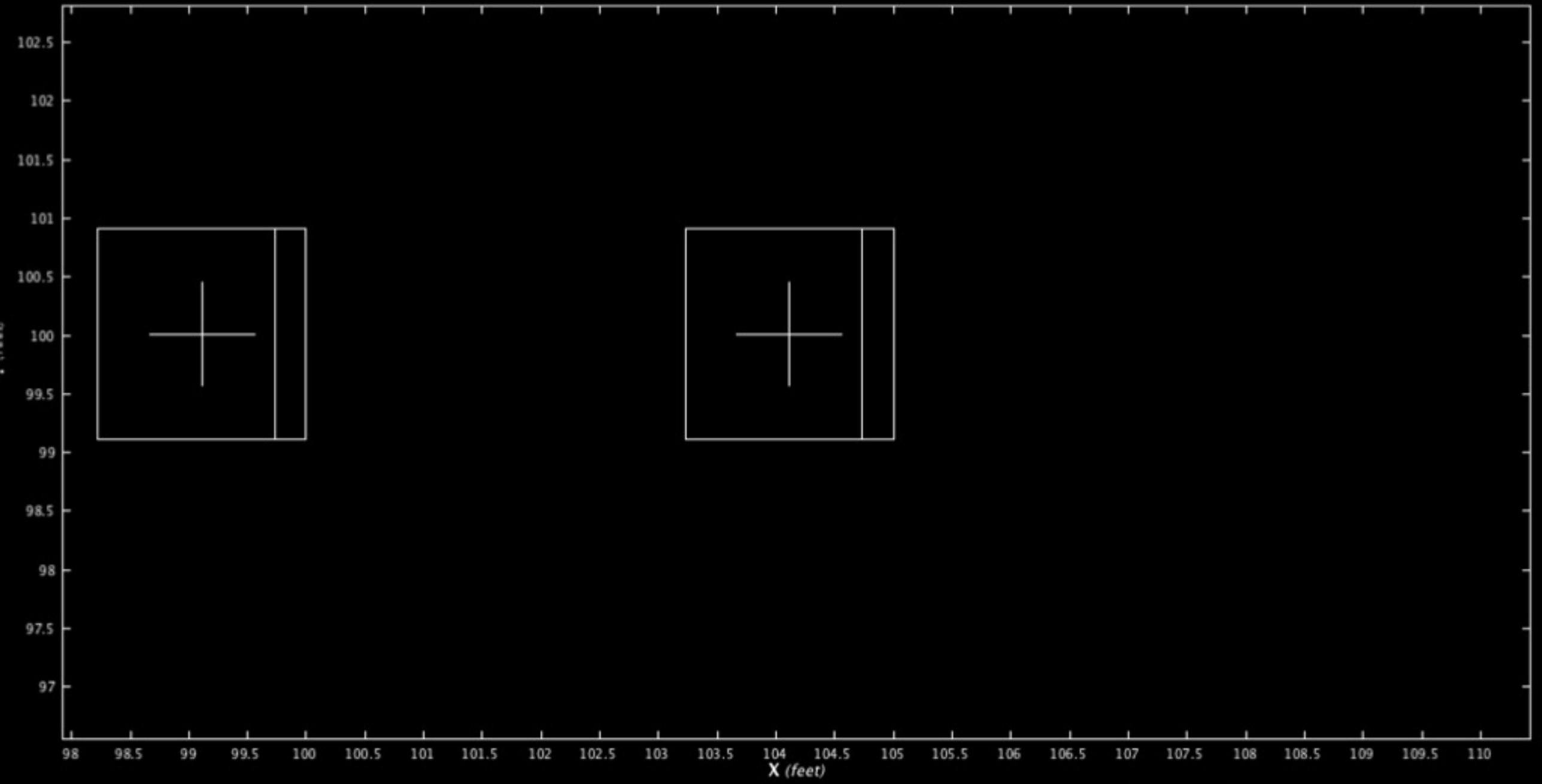
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 31.5 Hz
Start Frequency = 23.4 Hz
Stop Frequency = 45.4 Hz

Cardioid 31.5Hz 3ms


2ms
2.31ms
3ms
4ms

End-Fire

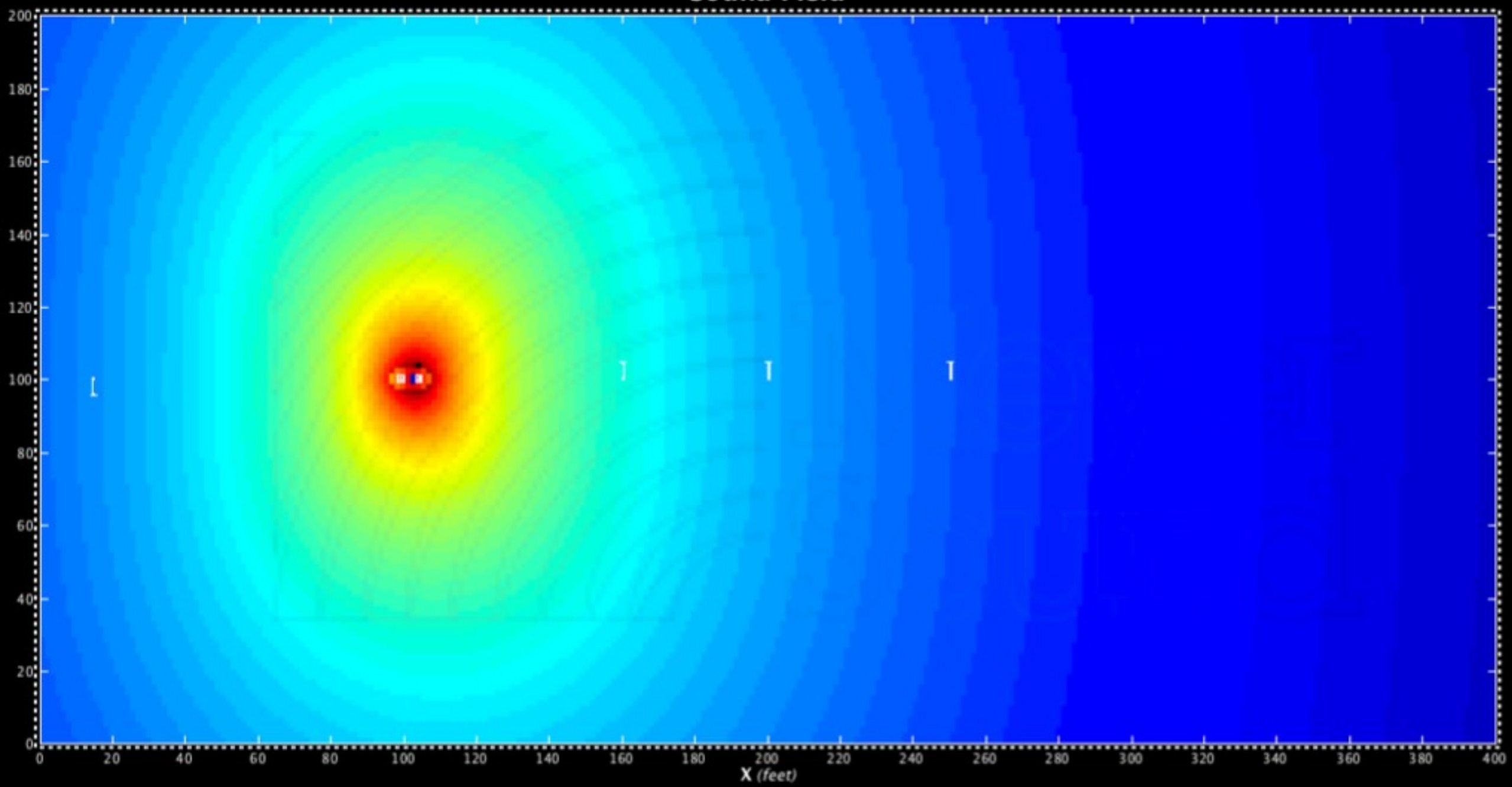


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

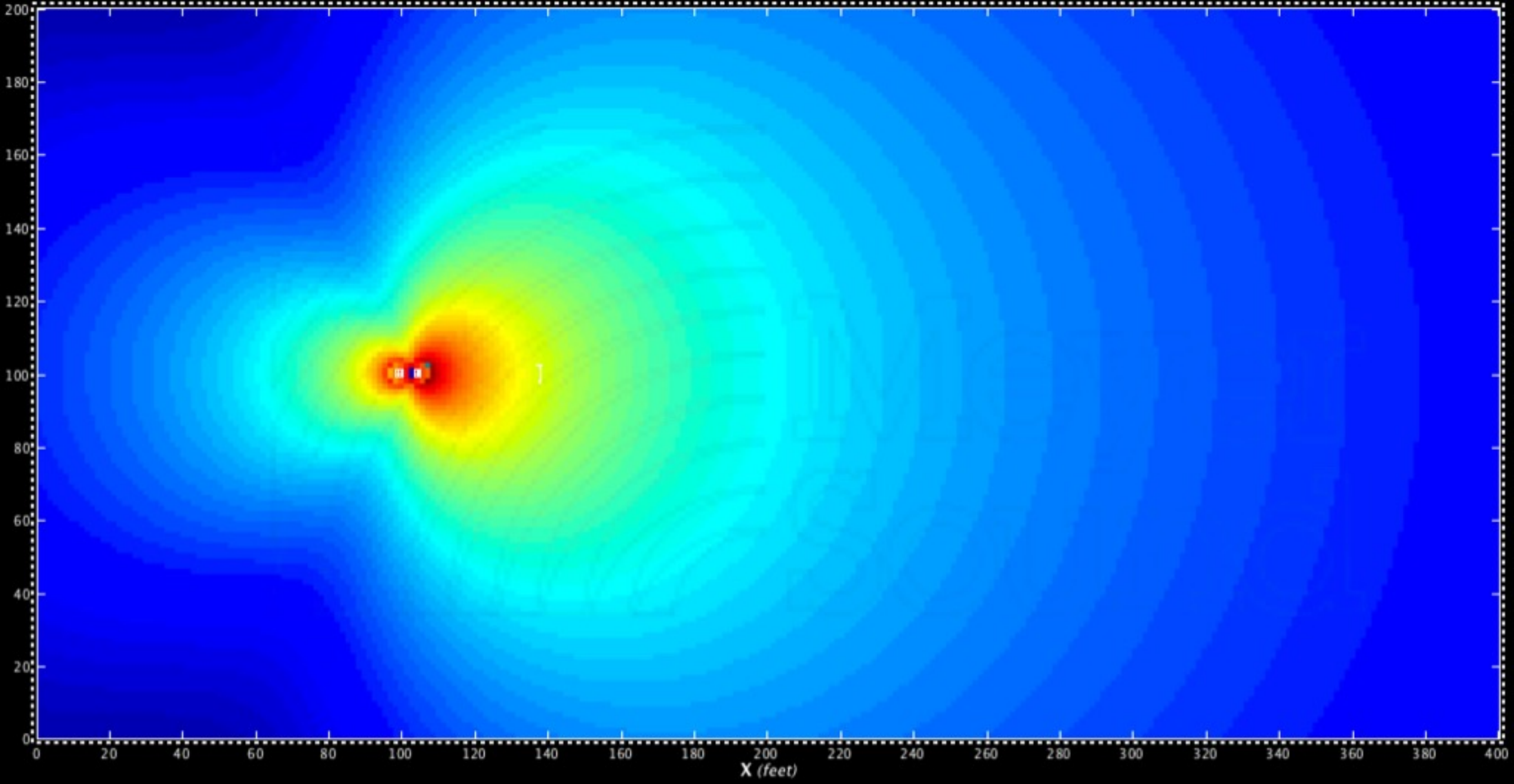
End Fire Detail



Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

2 USW 5’ spacing 0ms

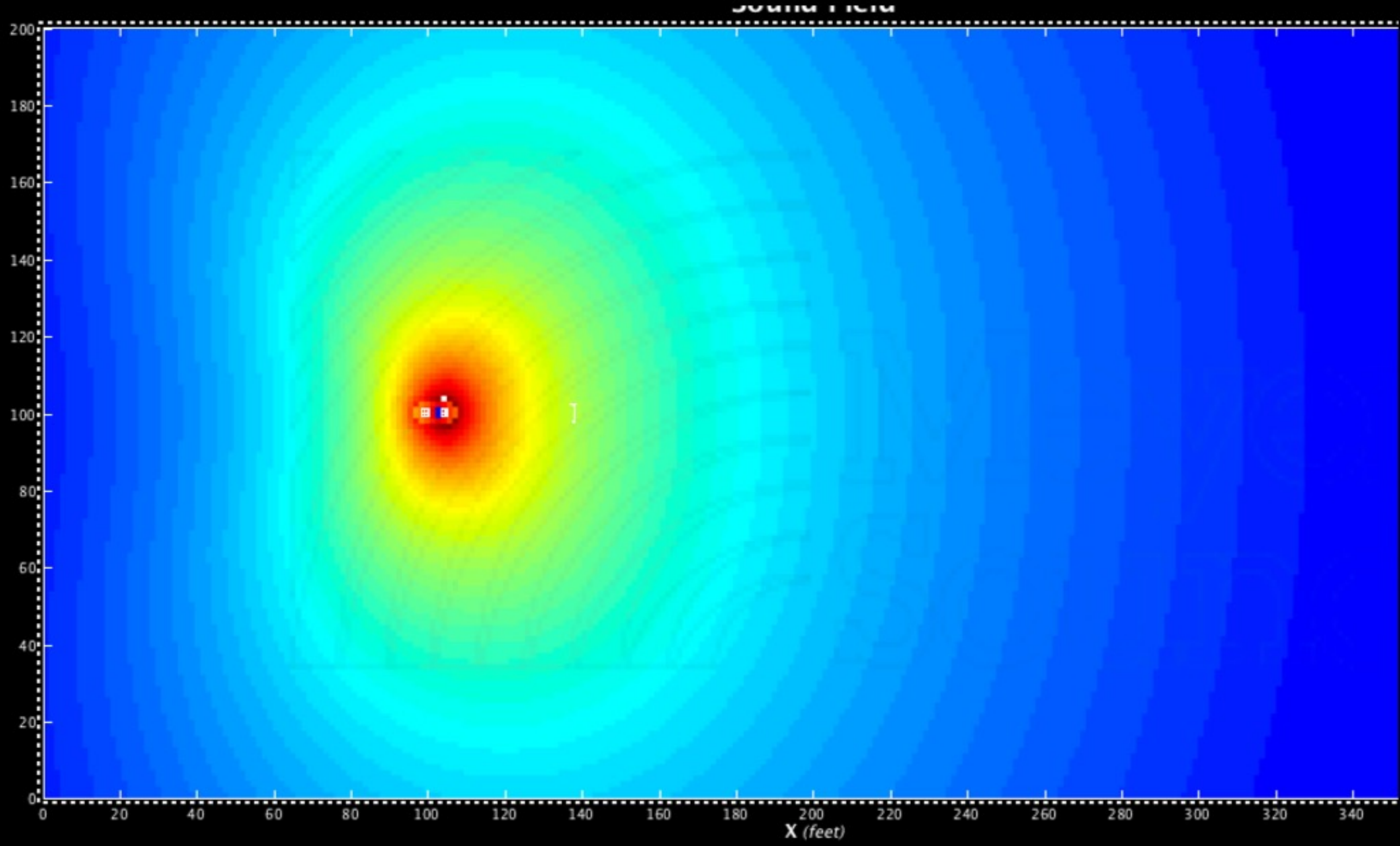


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

End Fire 63Hz measured 5.63ms



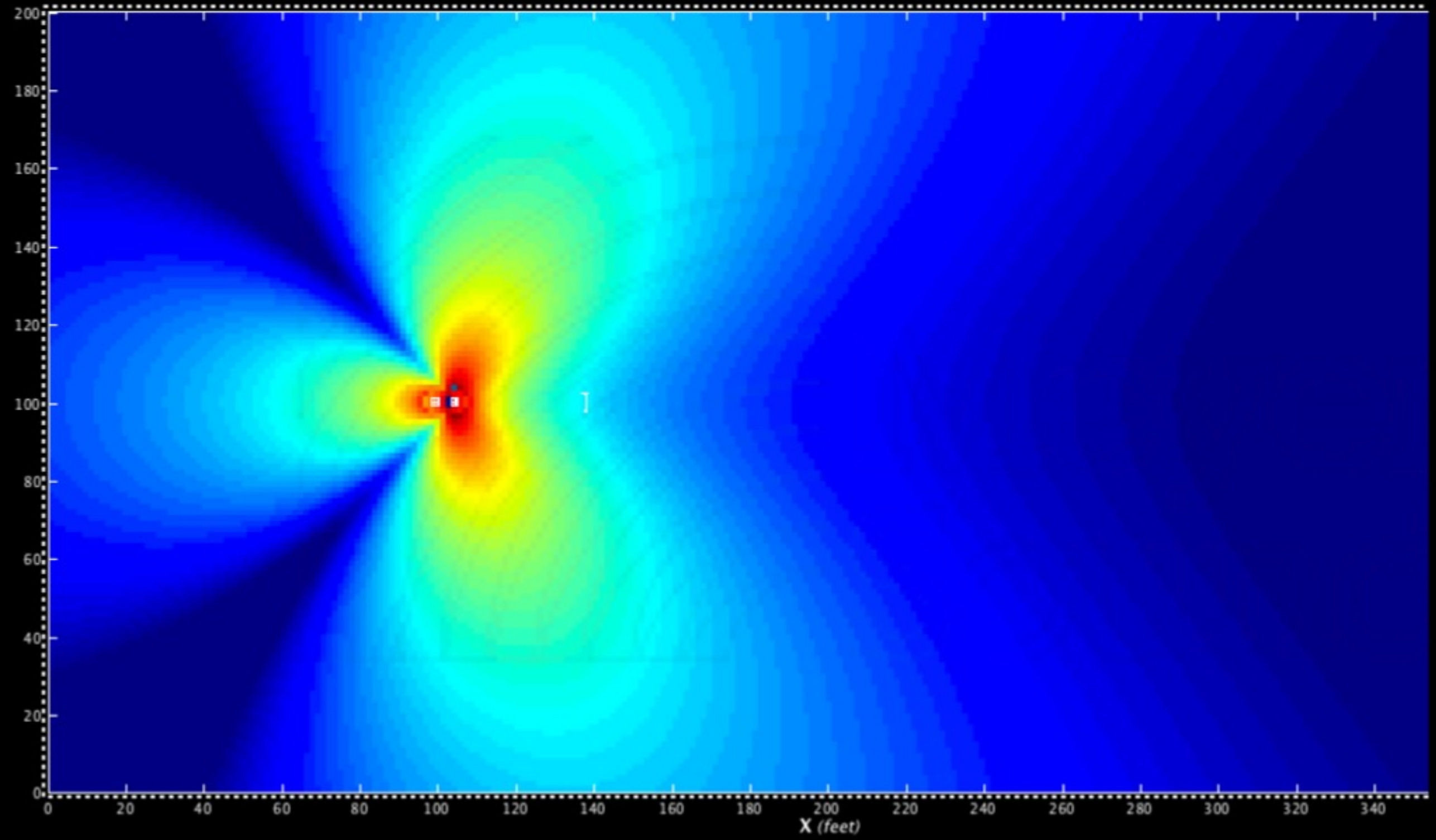
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

EF 63Hz 1ms

Relative Bandwidth = 1/3 octave
Center Frequency = 63 Hz
Start Frequency = 57.1 Hz
Stop Frequency = 71.8 Hz

Meyer Sound

Sound Field



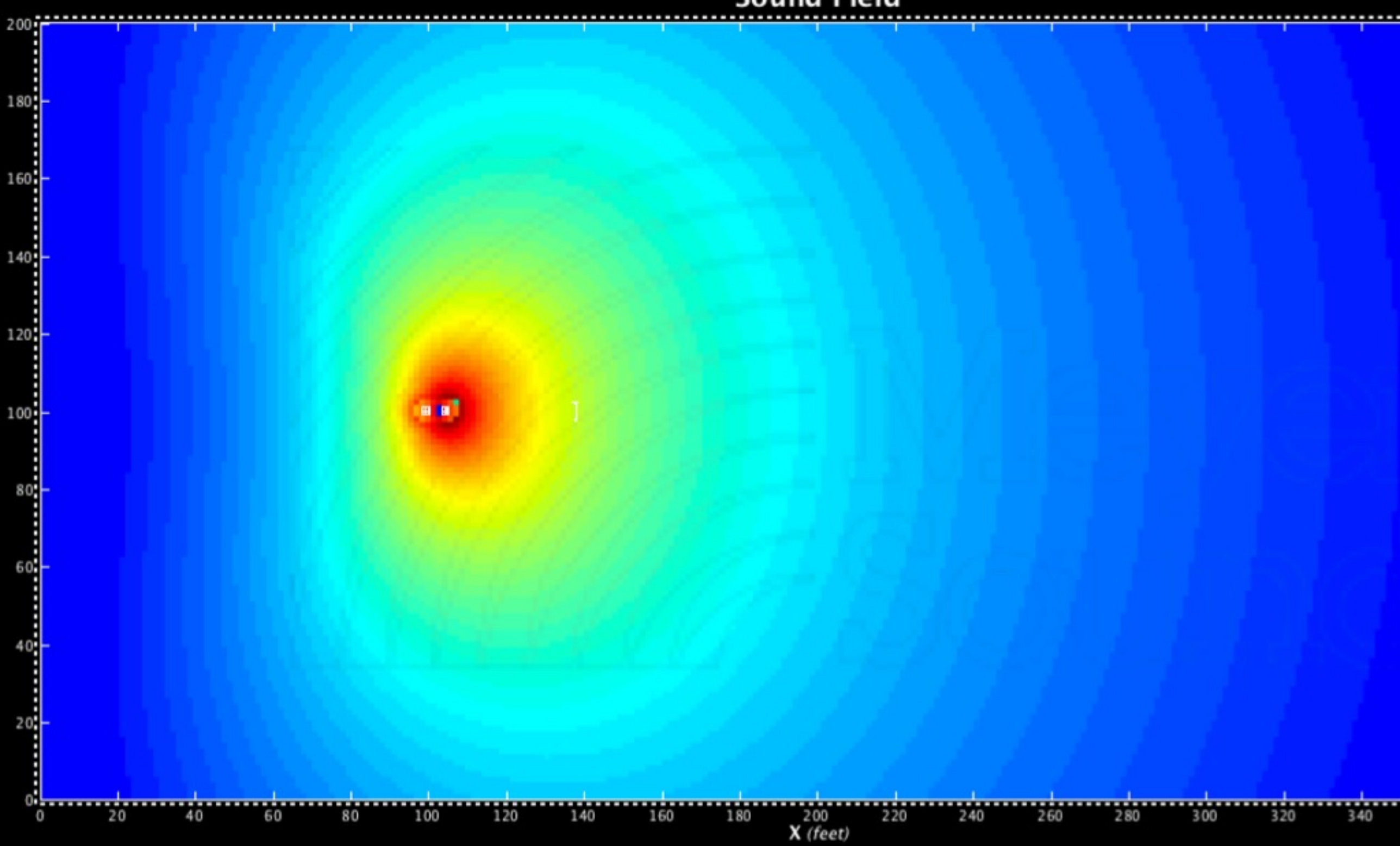
Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

EF 125Hz 1ms

Relative Bandwidth = 1/3 octave
Center Frequency = 125 Hz
Start Frequency = 112.8 Hz
Stop Frequency = 140.6 Hz

Sound Field

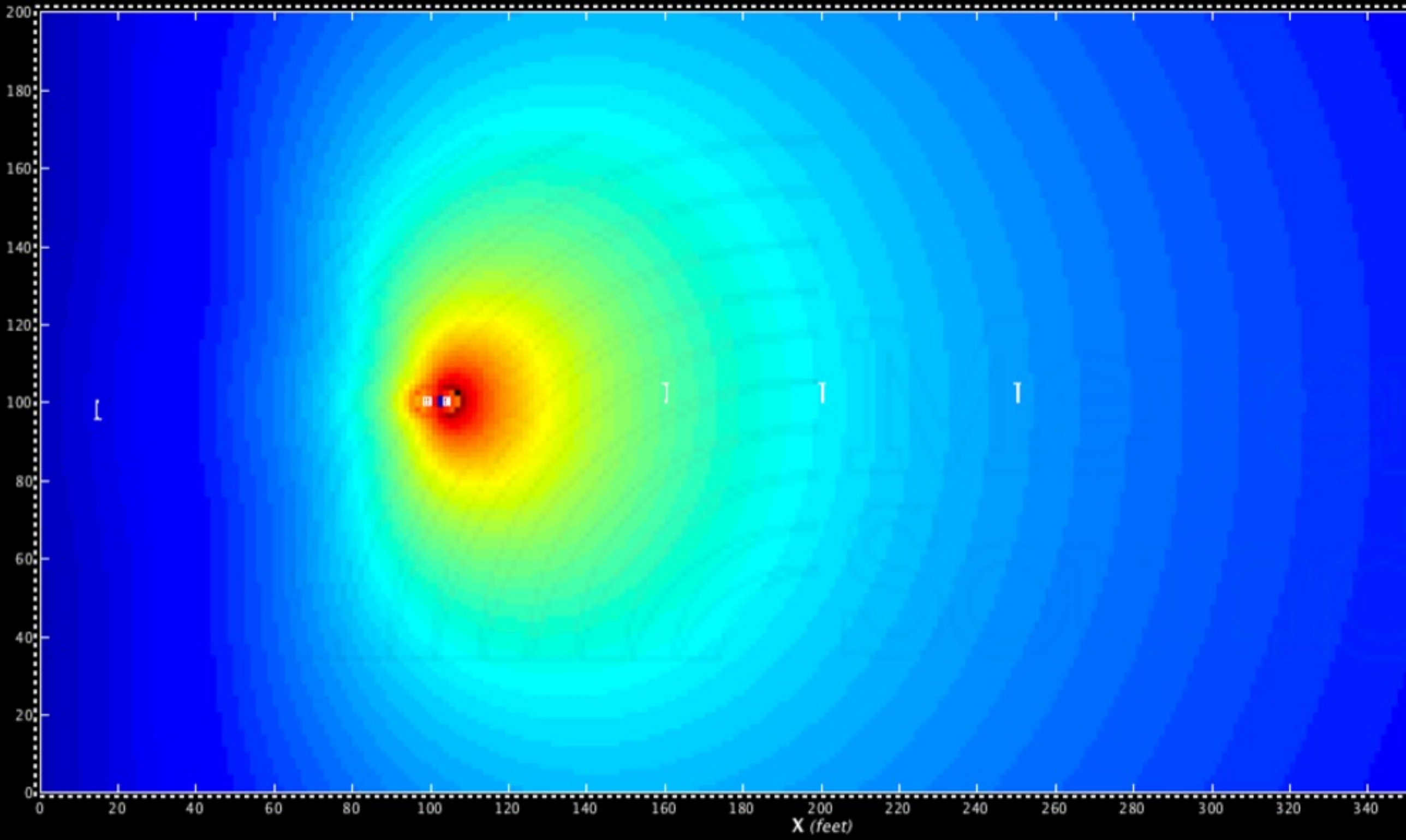


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

End Fire 63Hz 2ms

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

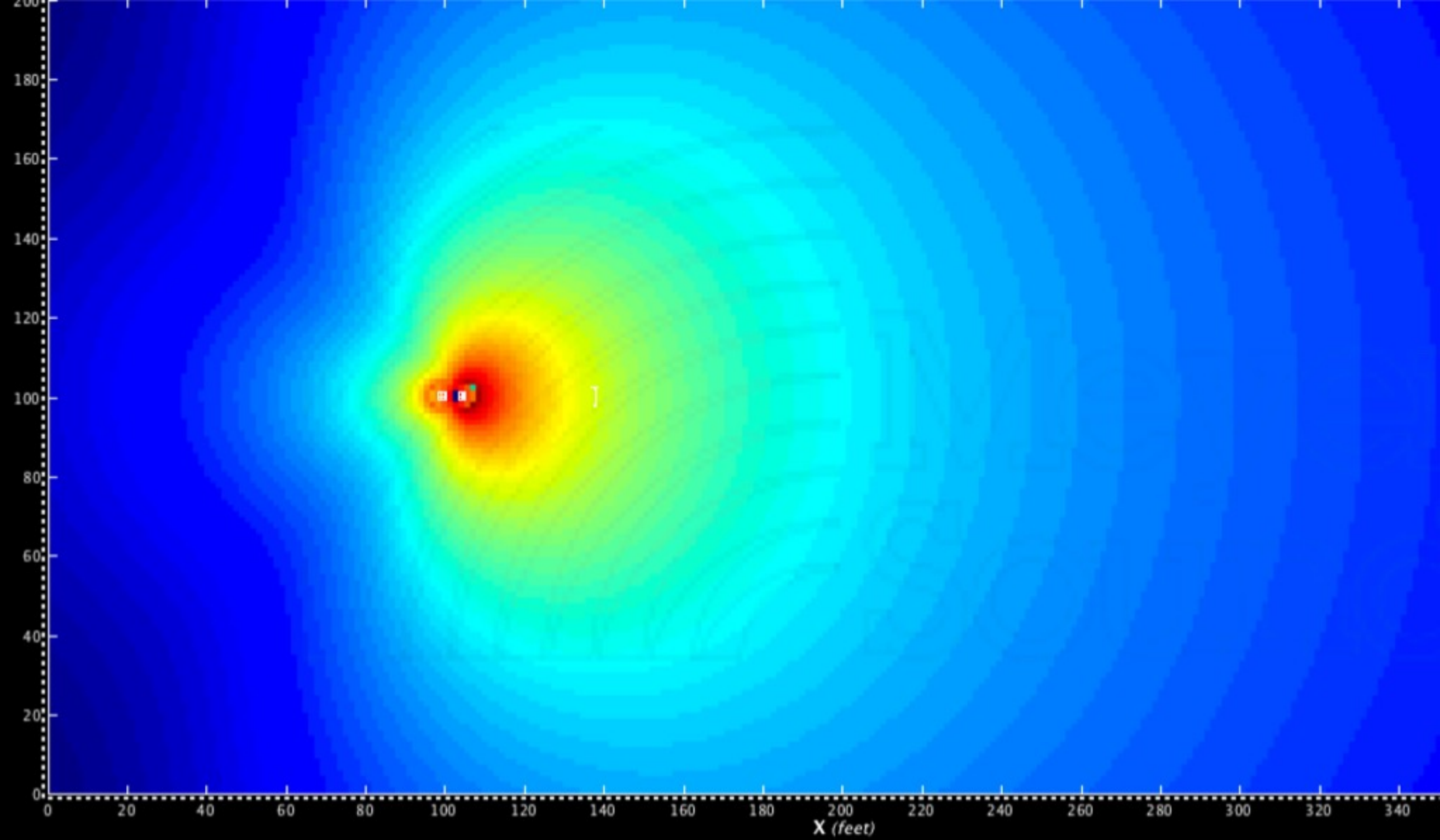


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

EF 63Hz 3ms

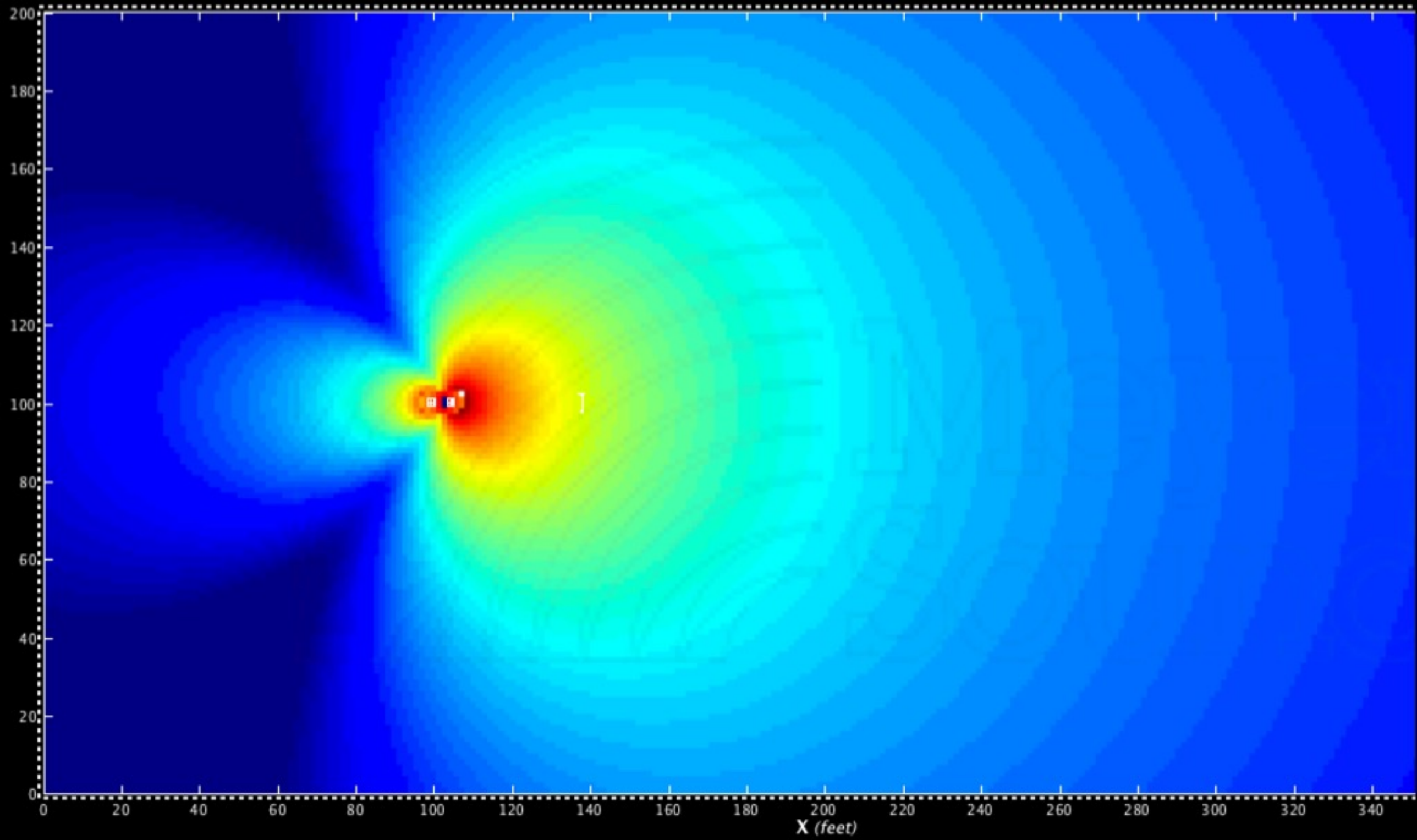


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

EF 63Hz 4ms

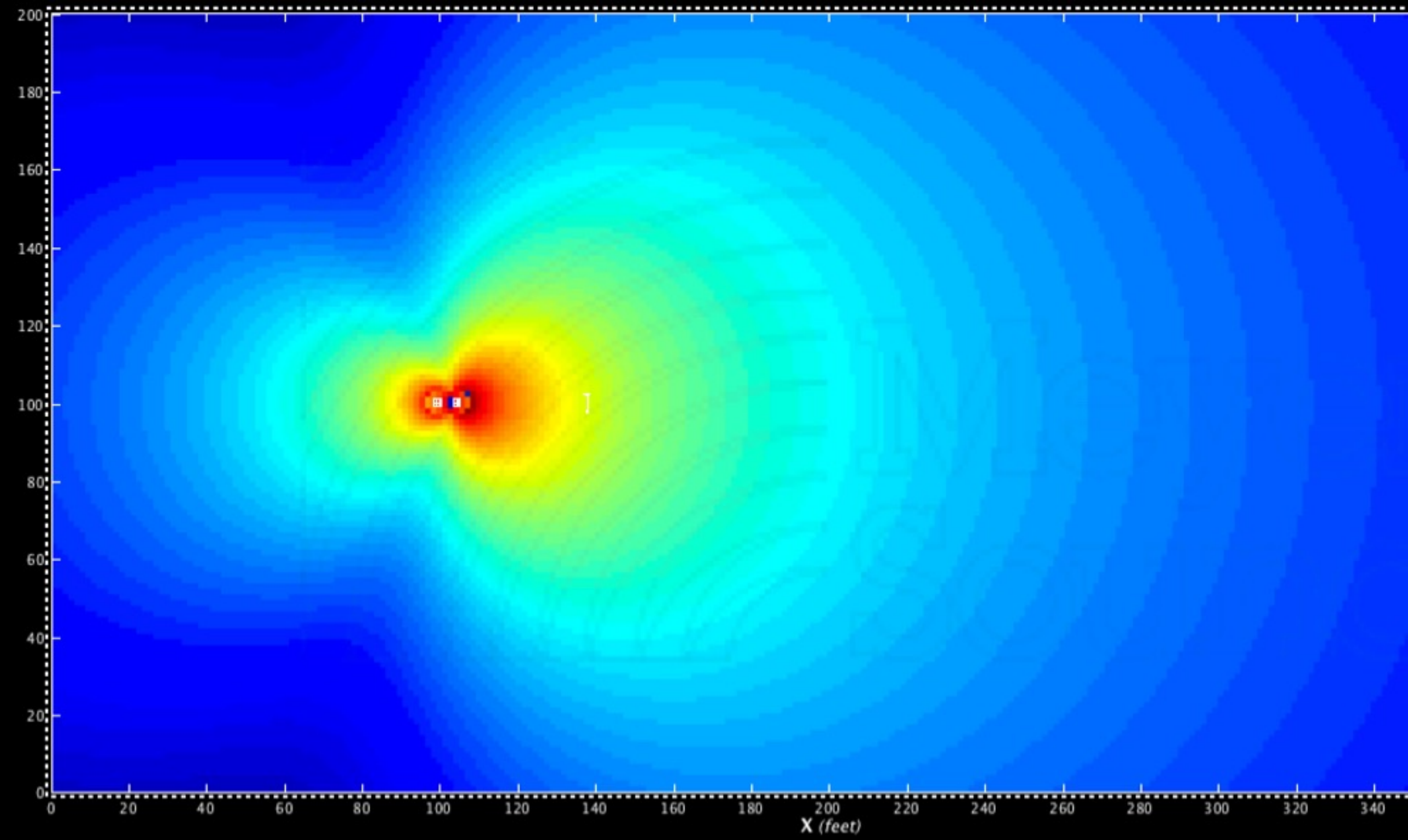


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1/3 octave
Center Frequency = 63 Hz
Start Frequency = 57.1 Hz
Stop Frequency = 71.8 Hz

EF 63Hz 5ms

Meyer Sound

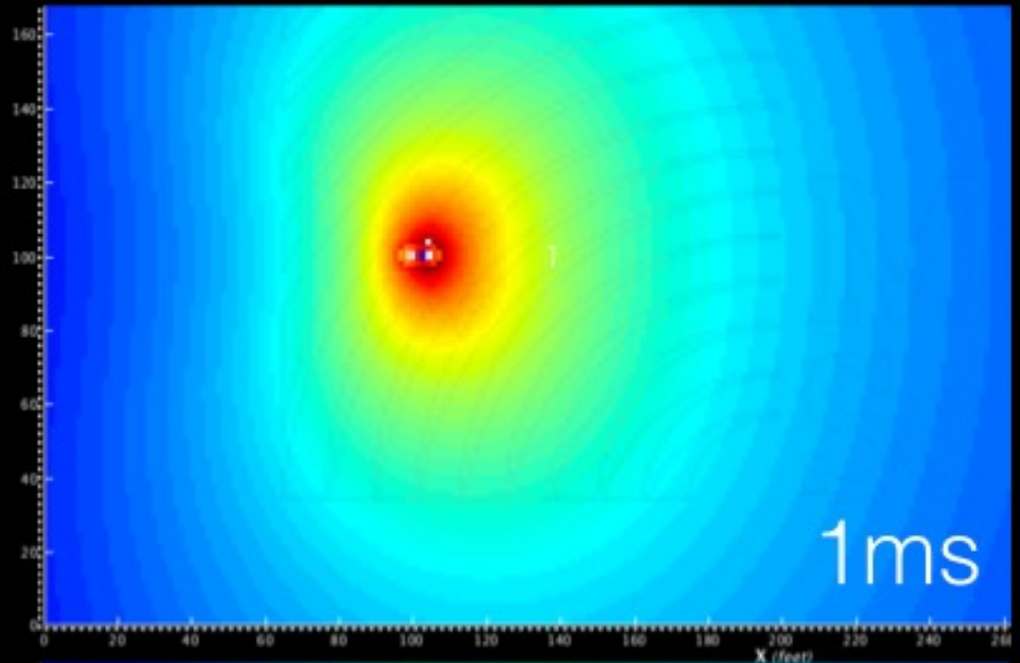


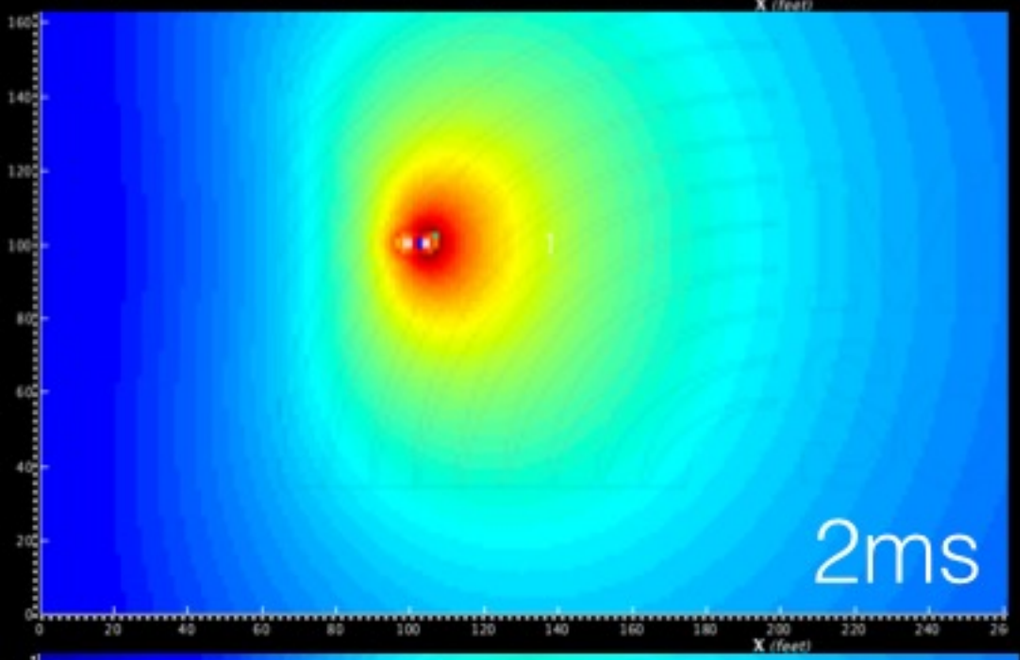
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

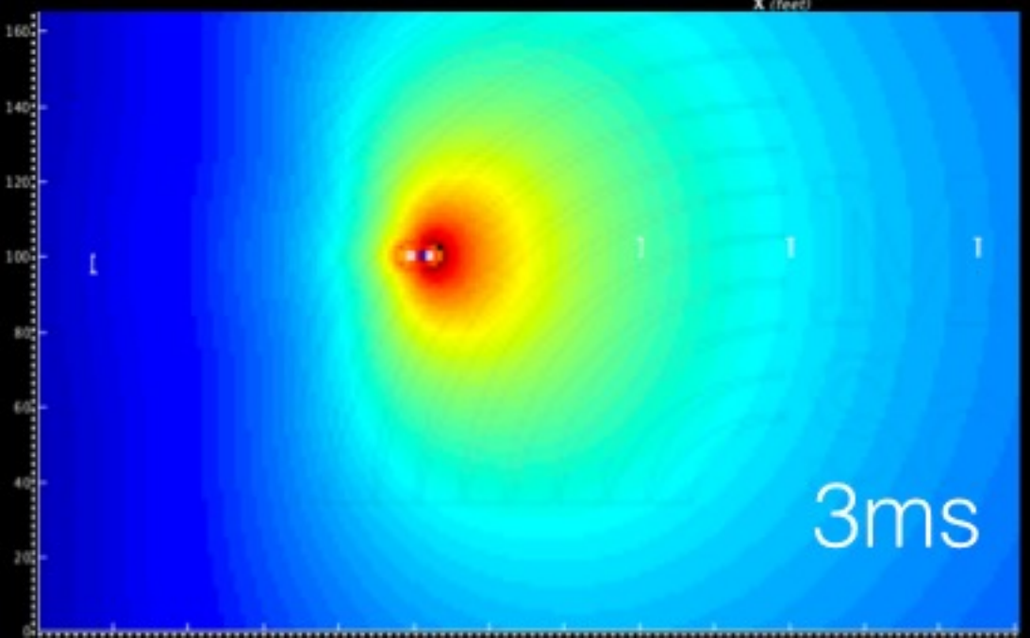
Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

EF 63Hz 6ms

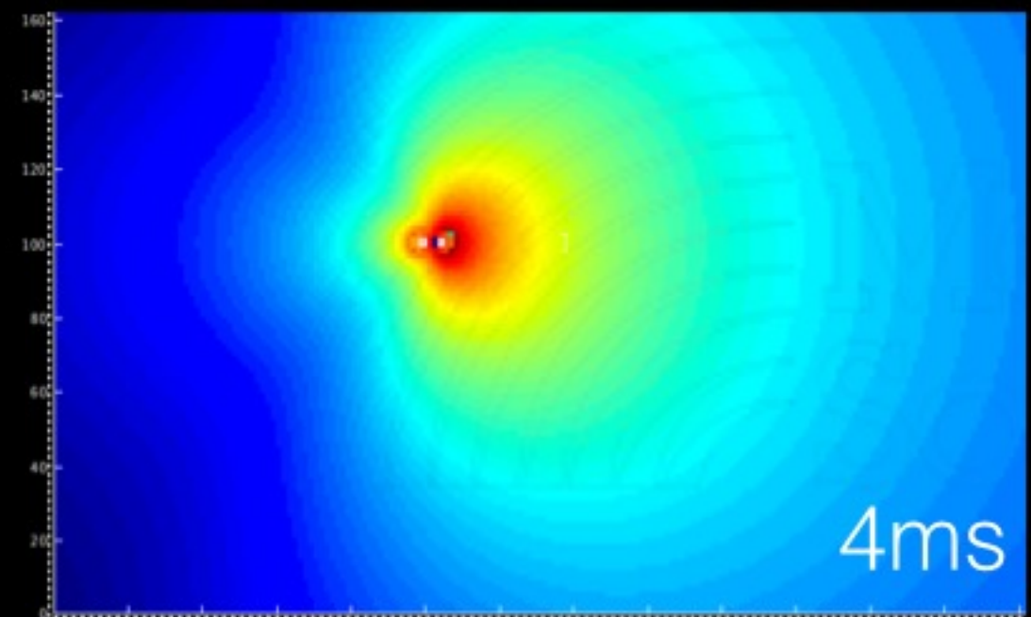
Meyer Sound

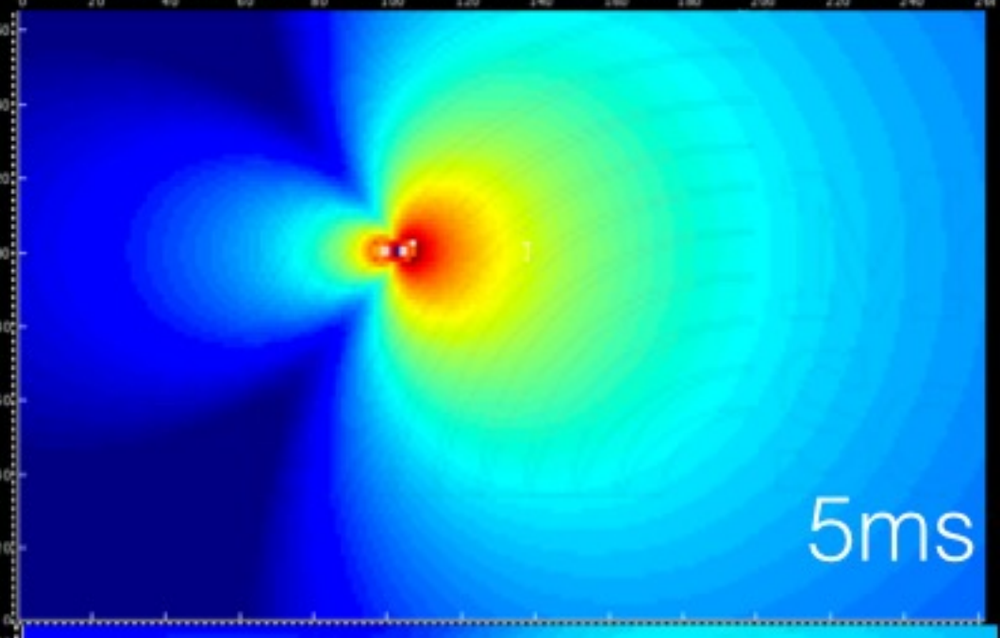


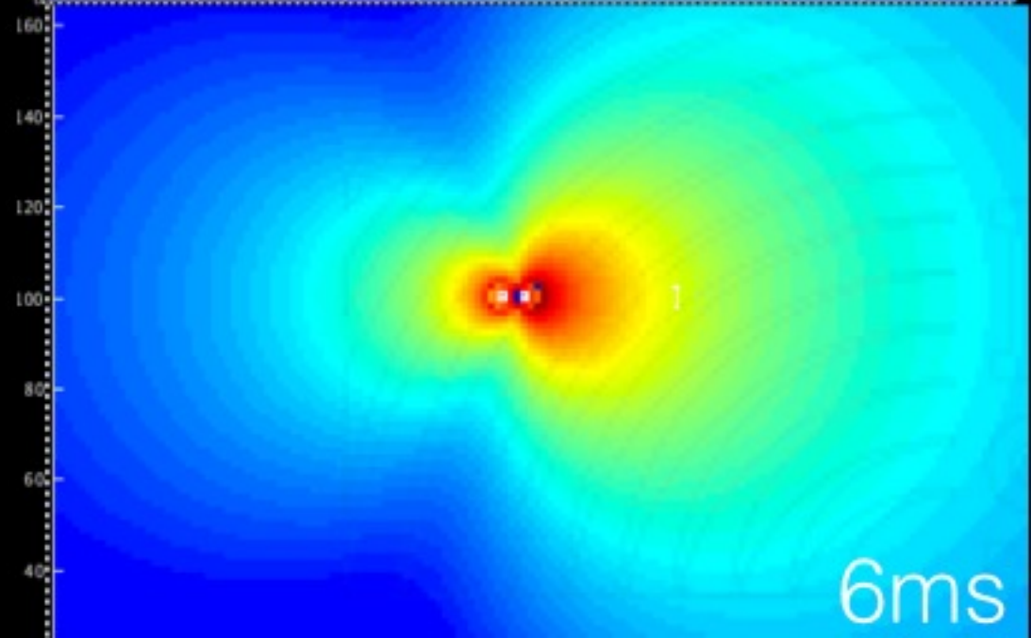


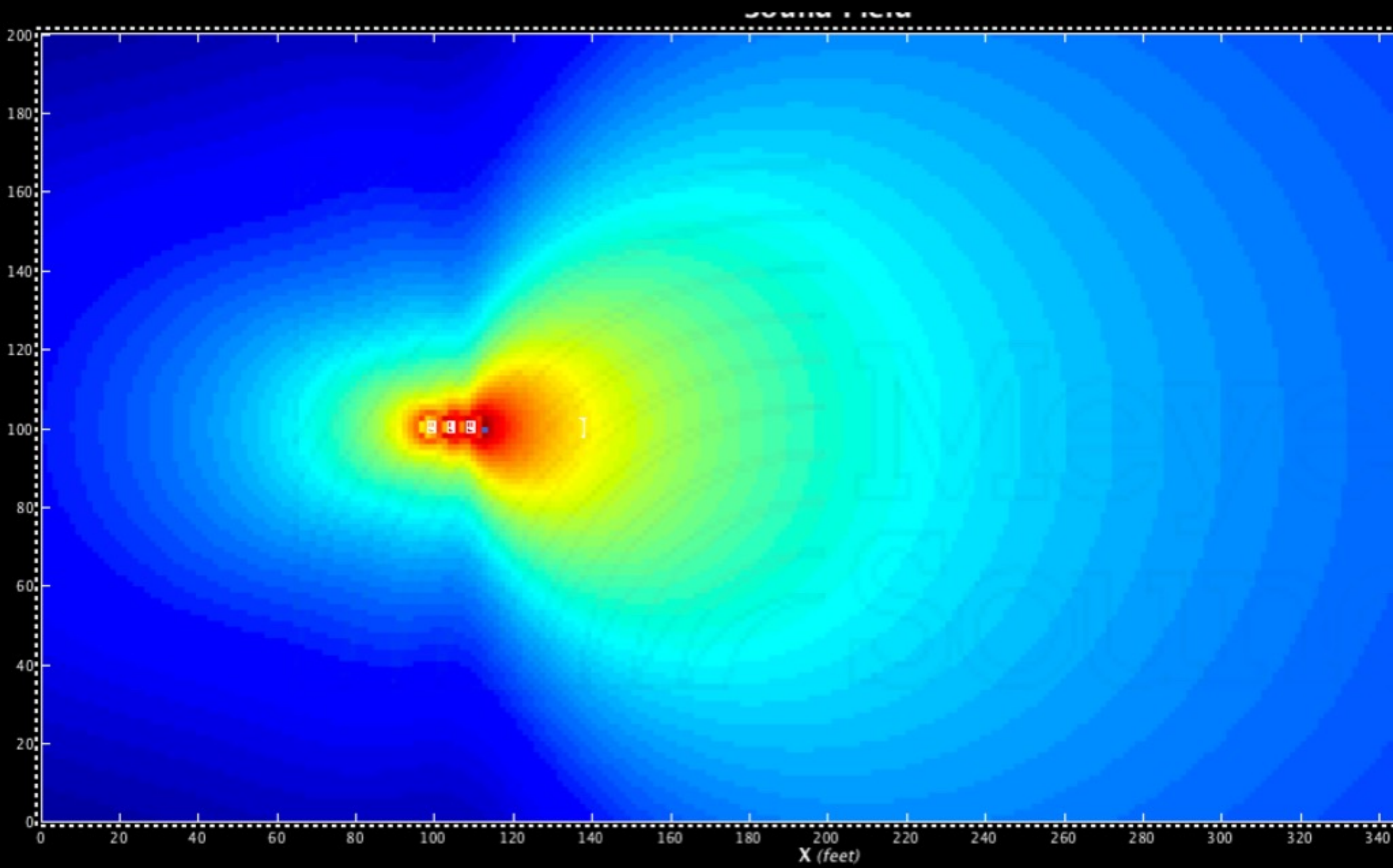


Various
End Fire
Array
Timings





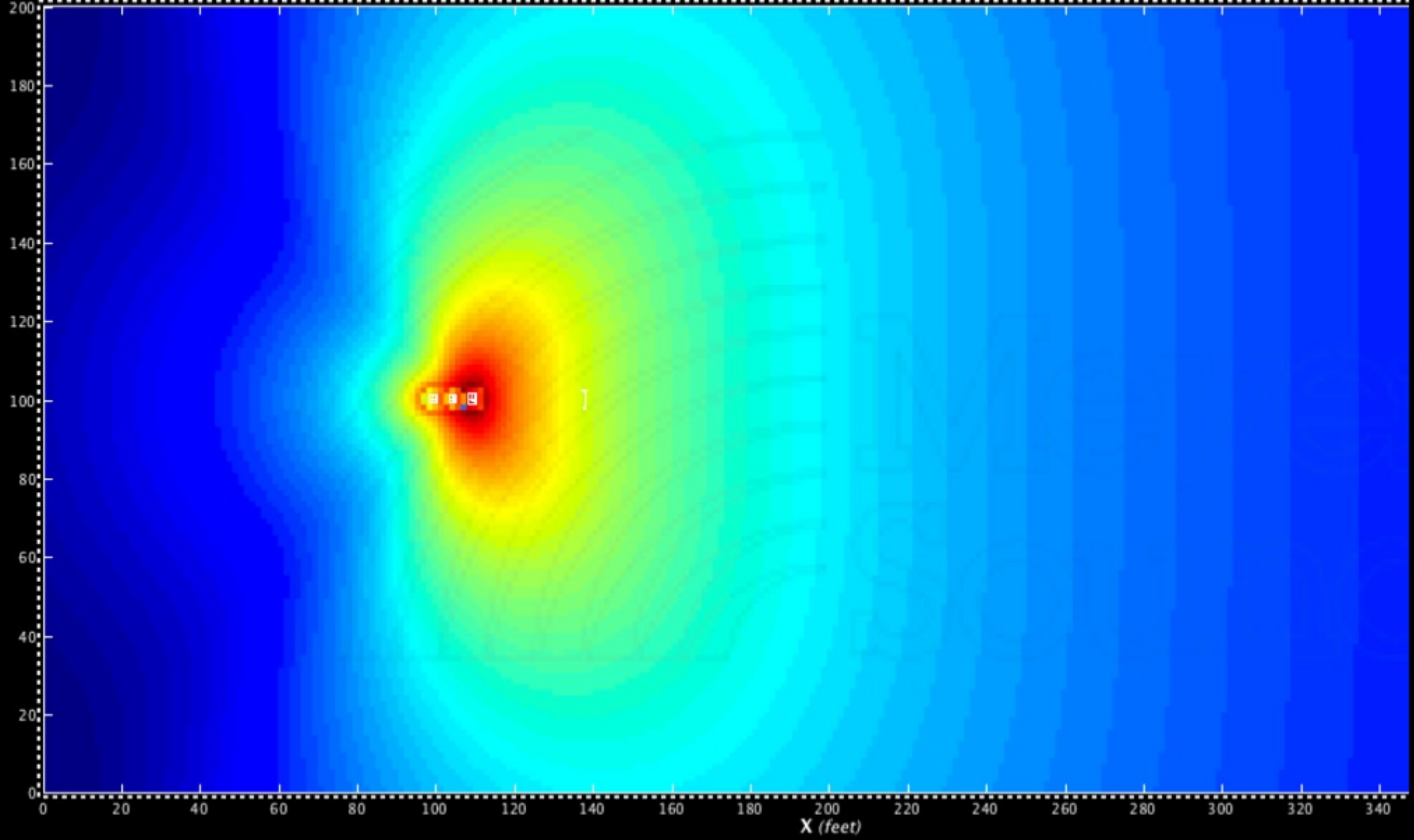




Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

3 EF 63Hz 5.62, 11.24ms



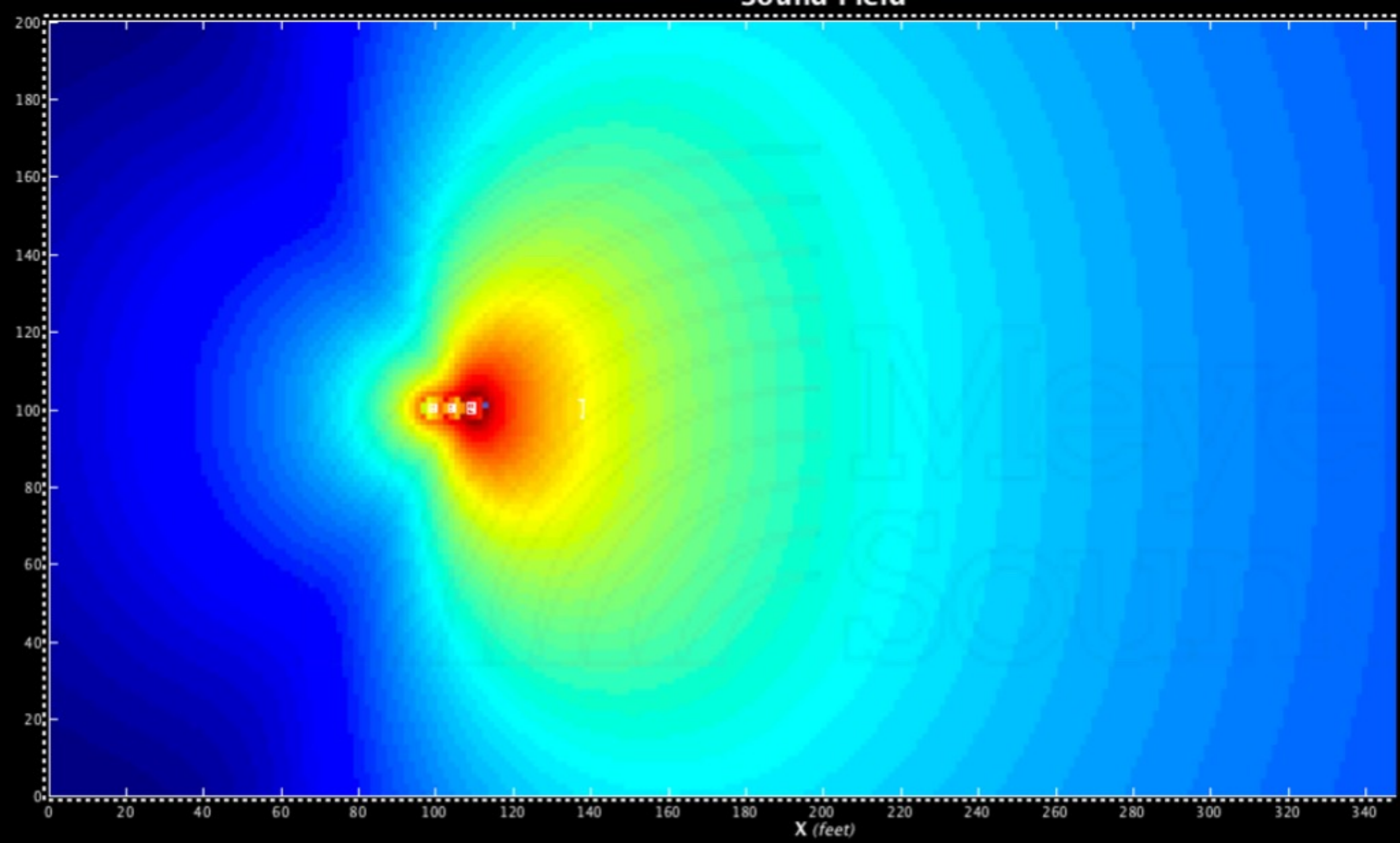
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

Meyer Sound

3 EF 63Hz 2, 4ms

Sound Field

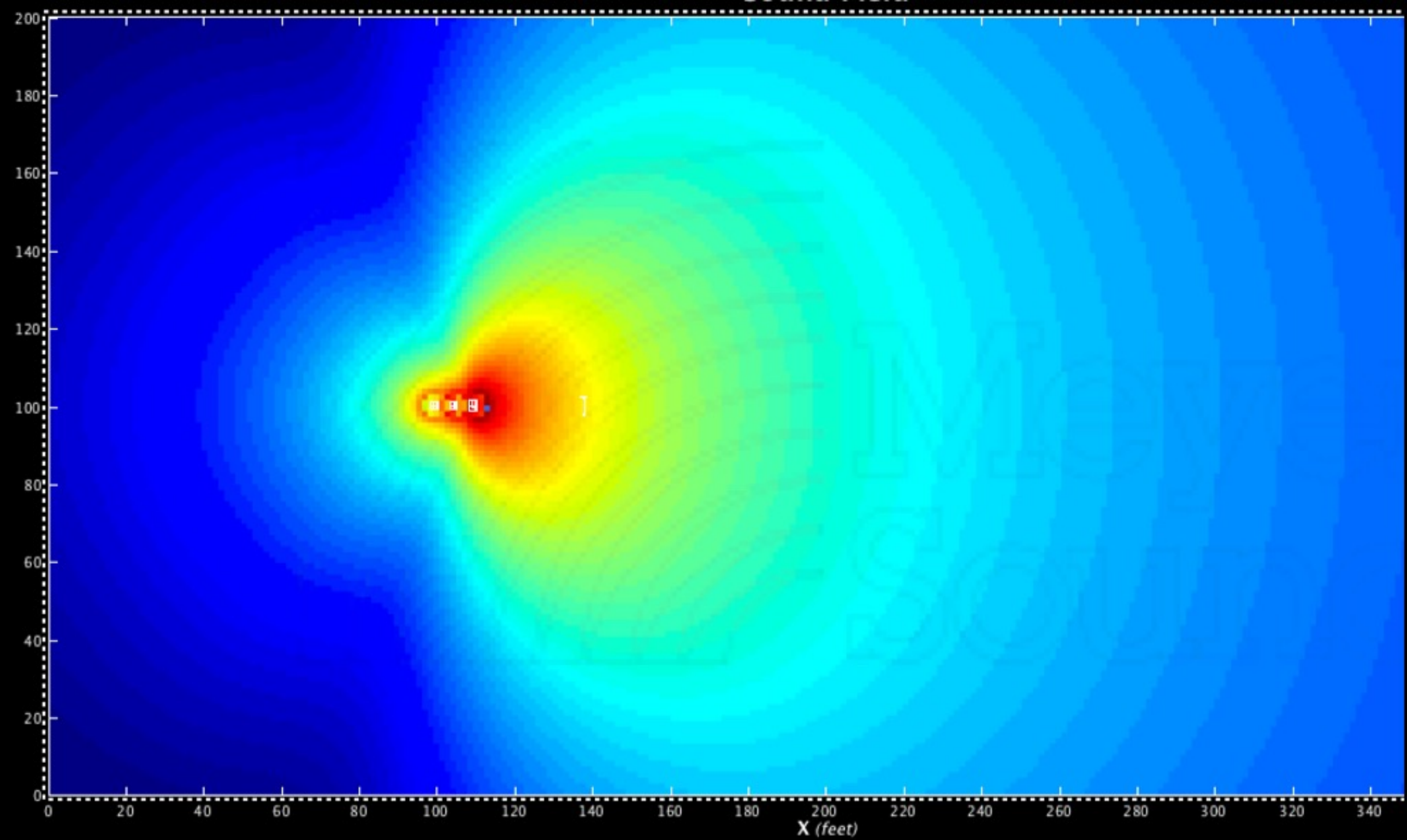


Meyer Sound

Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

3 EF 63Hz 3, 6ms

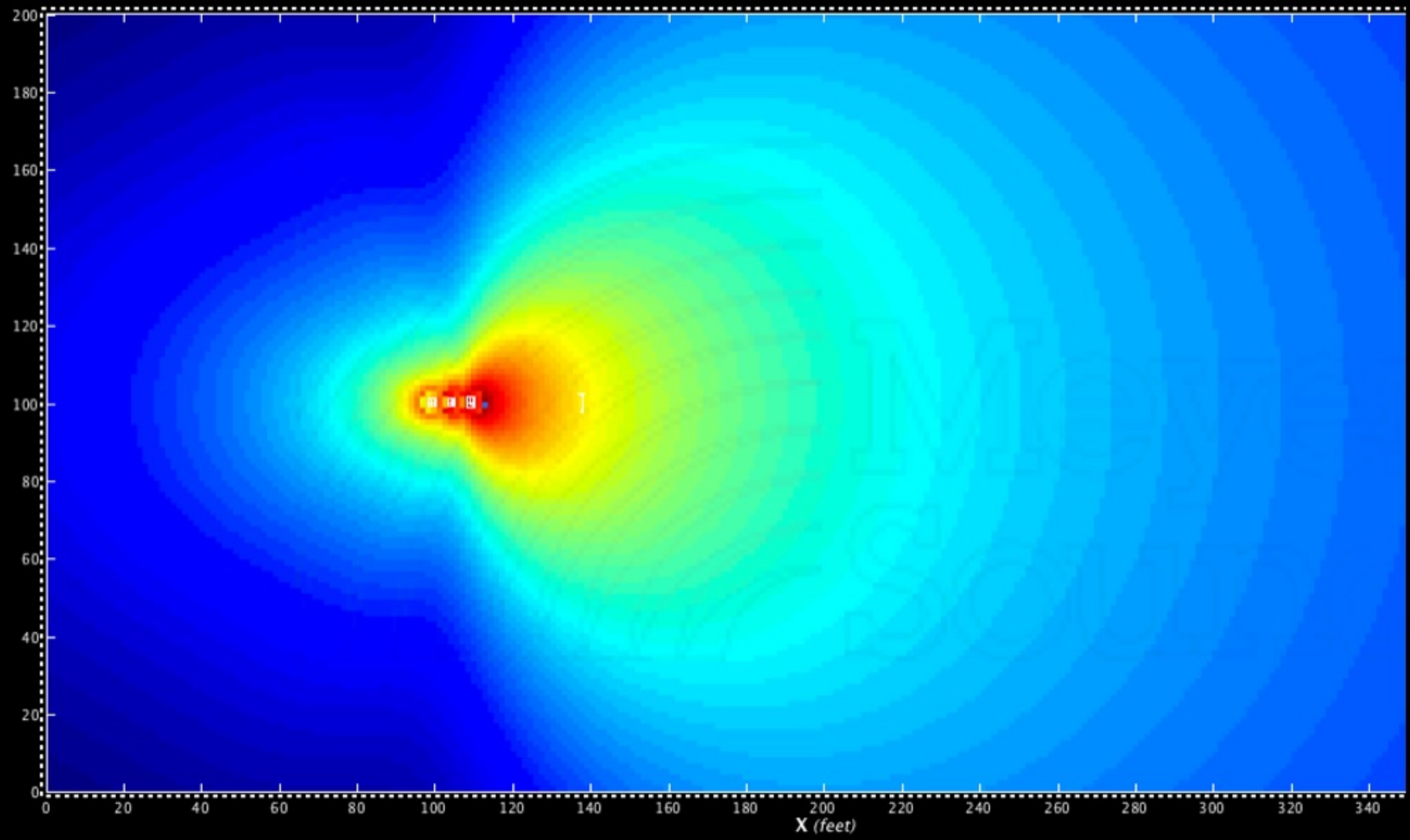


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

3 EF 63Hz 4, 8ms

Meyer Sound

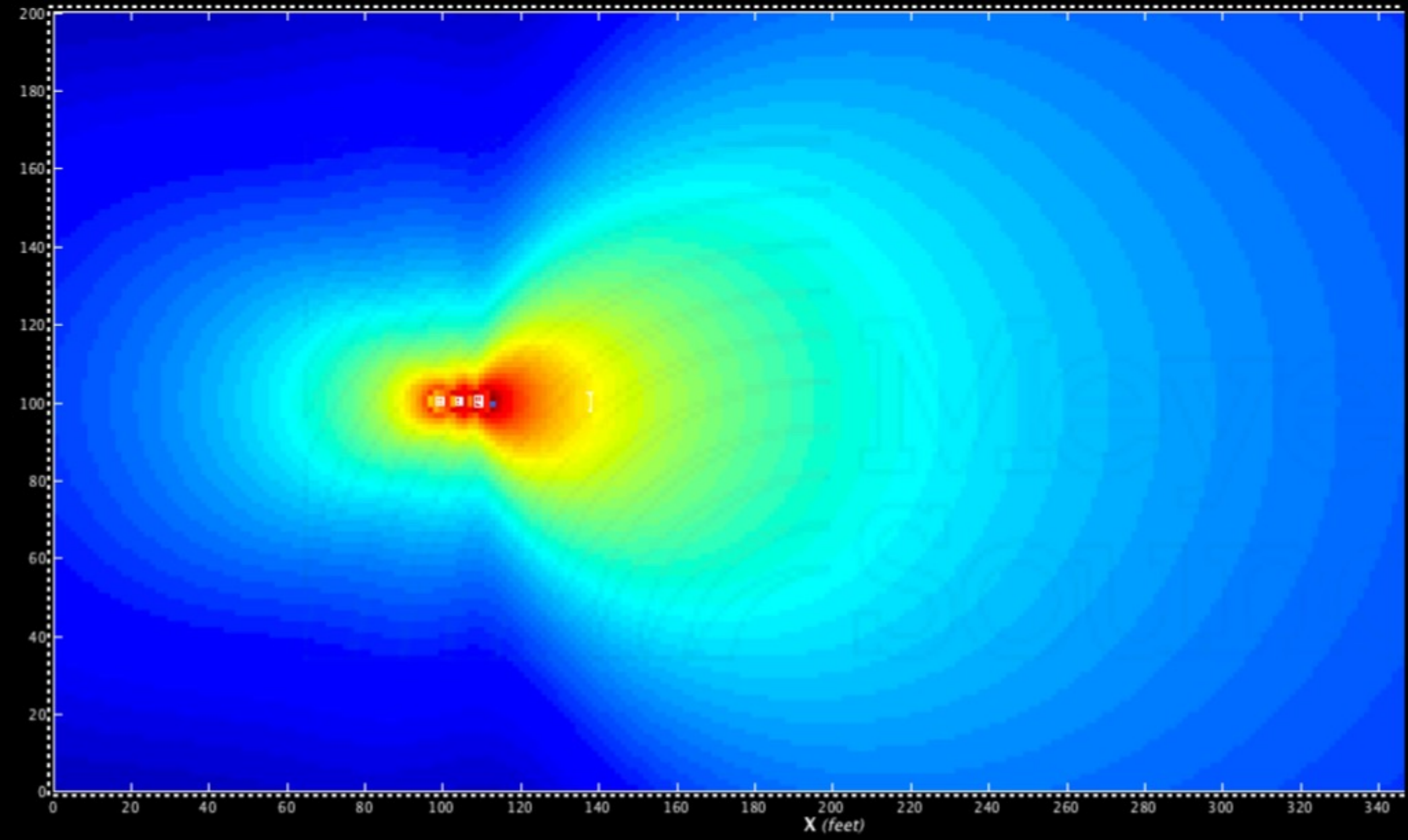


Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

3 EF 63Hz 5, 10ms

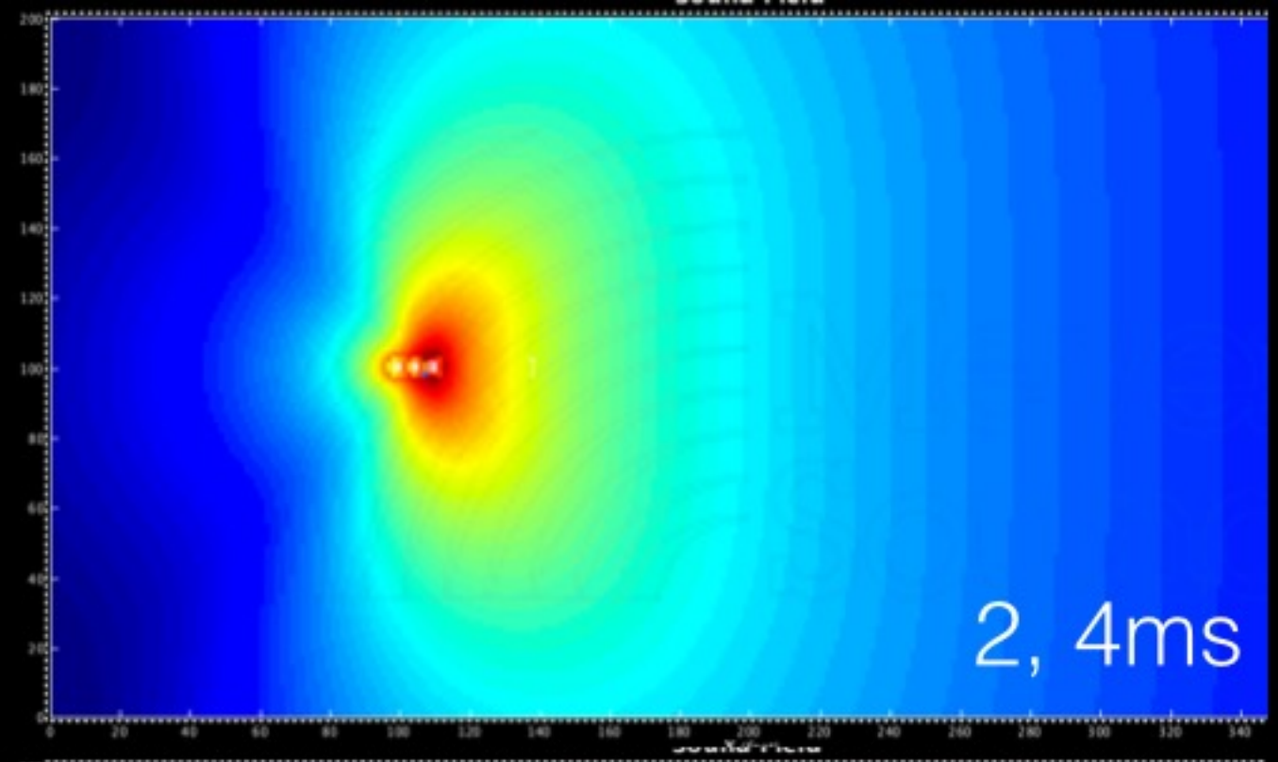
Meyer Sound

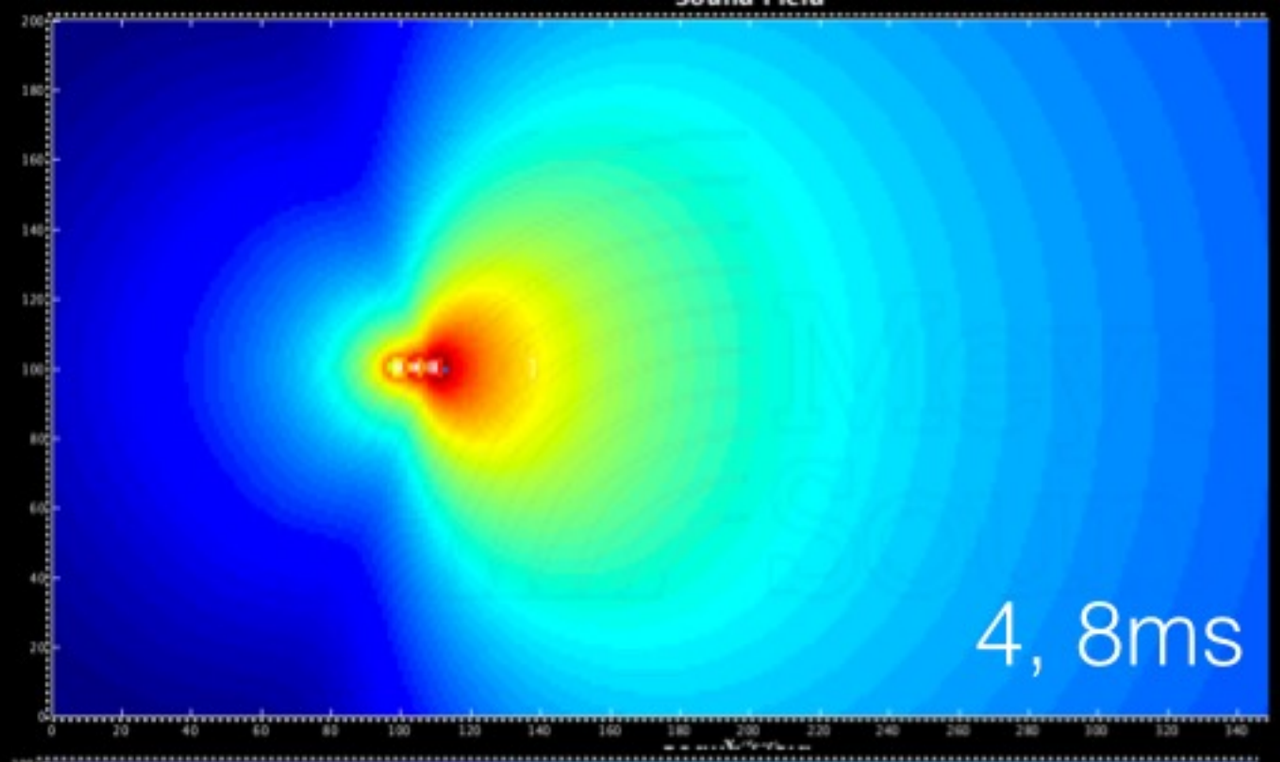


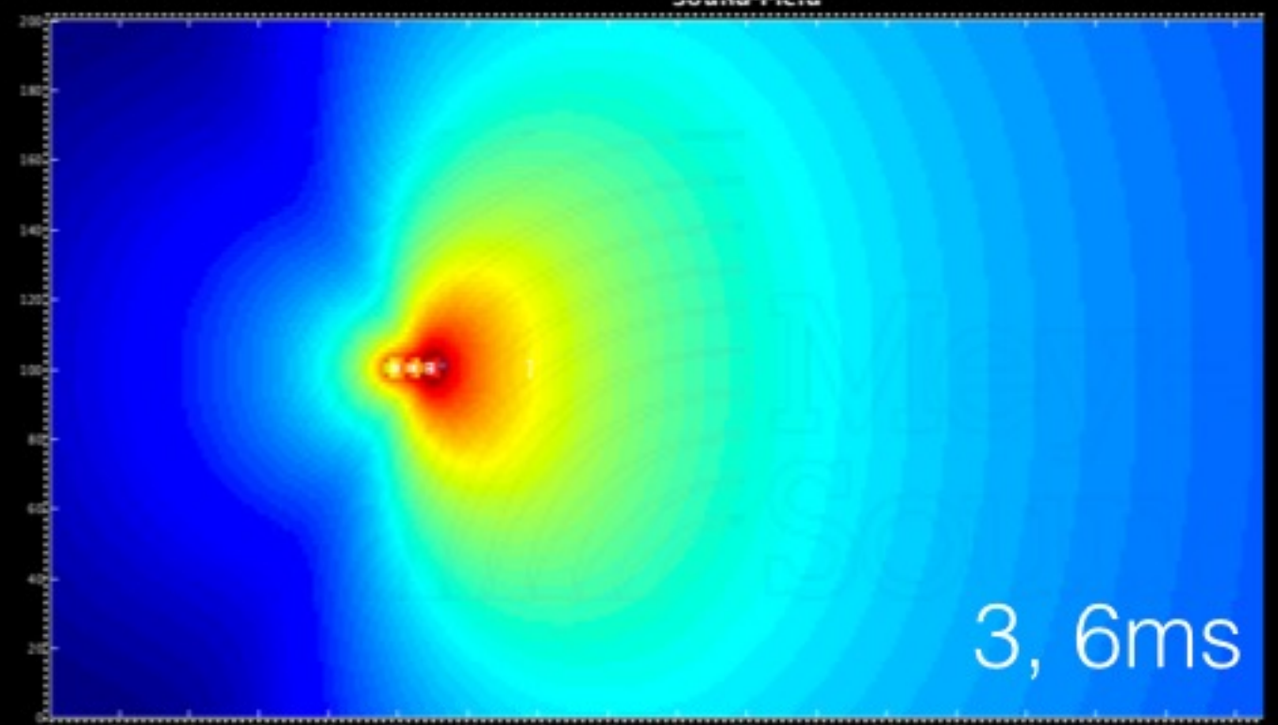
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

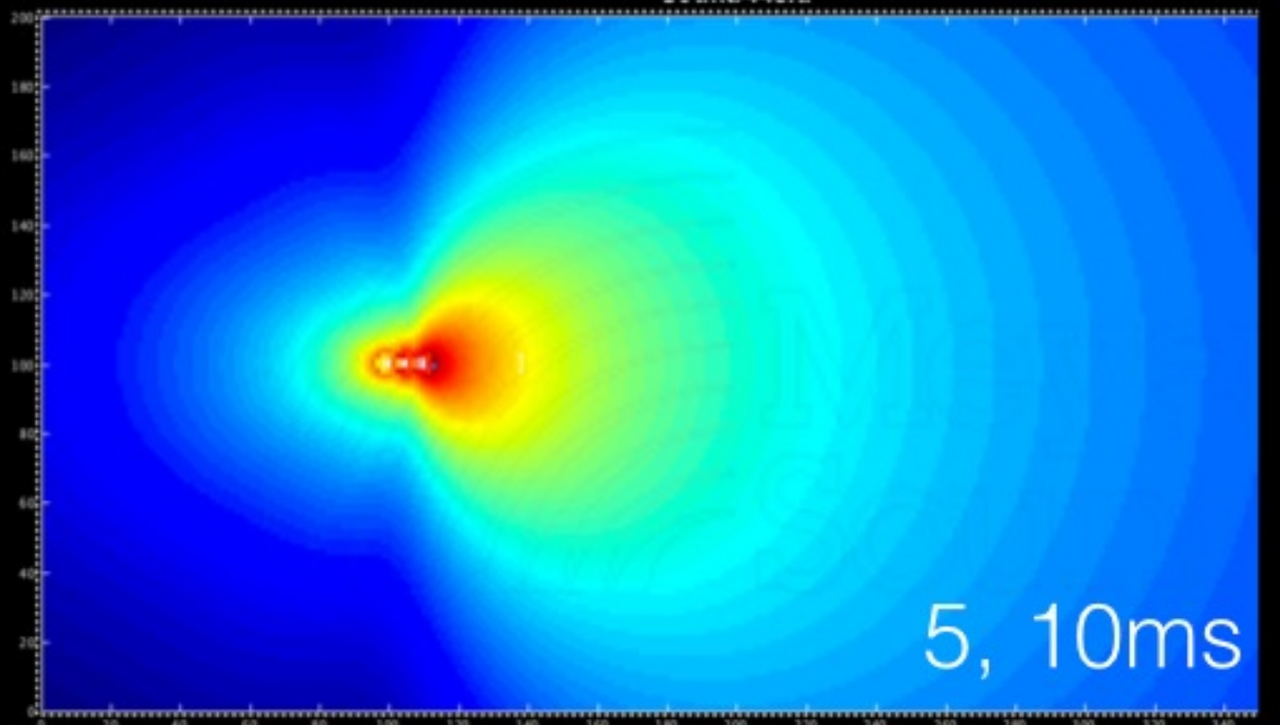
Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

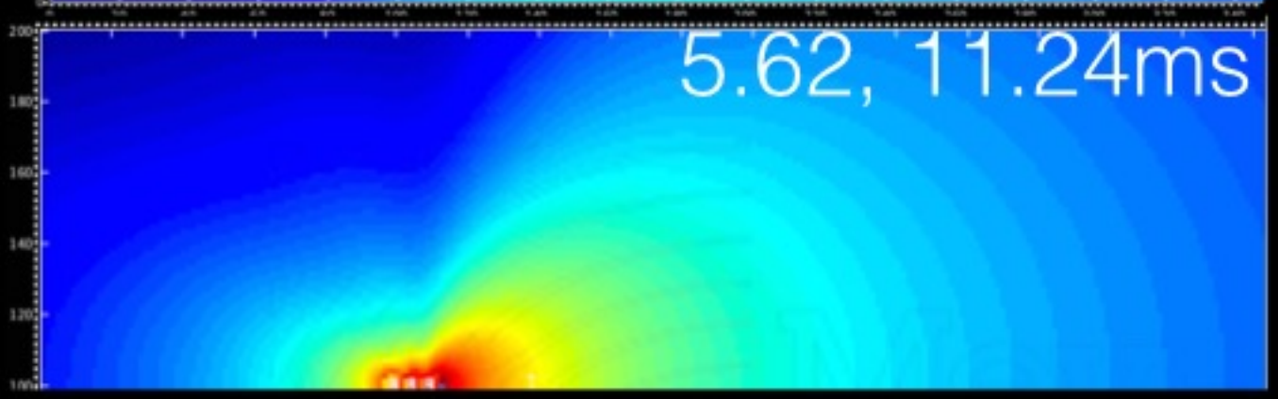
3 EF 63Hz 6, 12ms

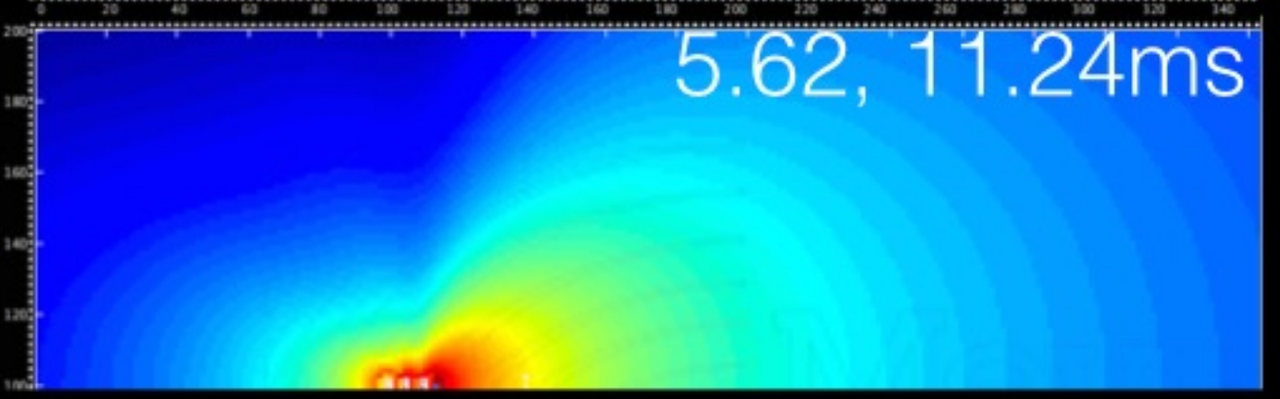

2, 4ms

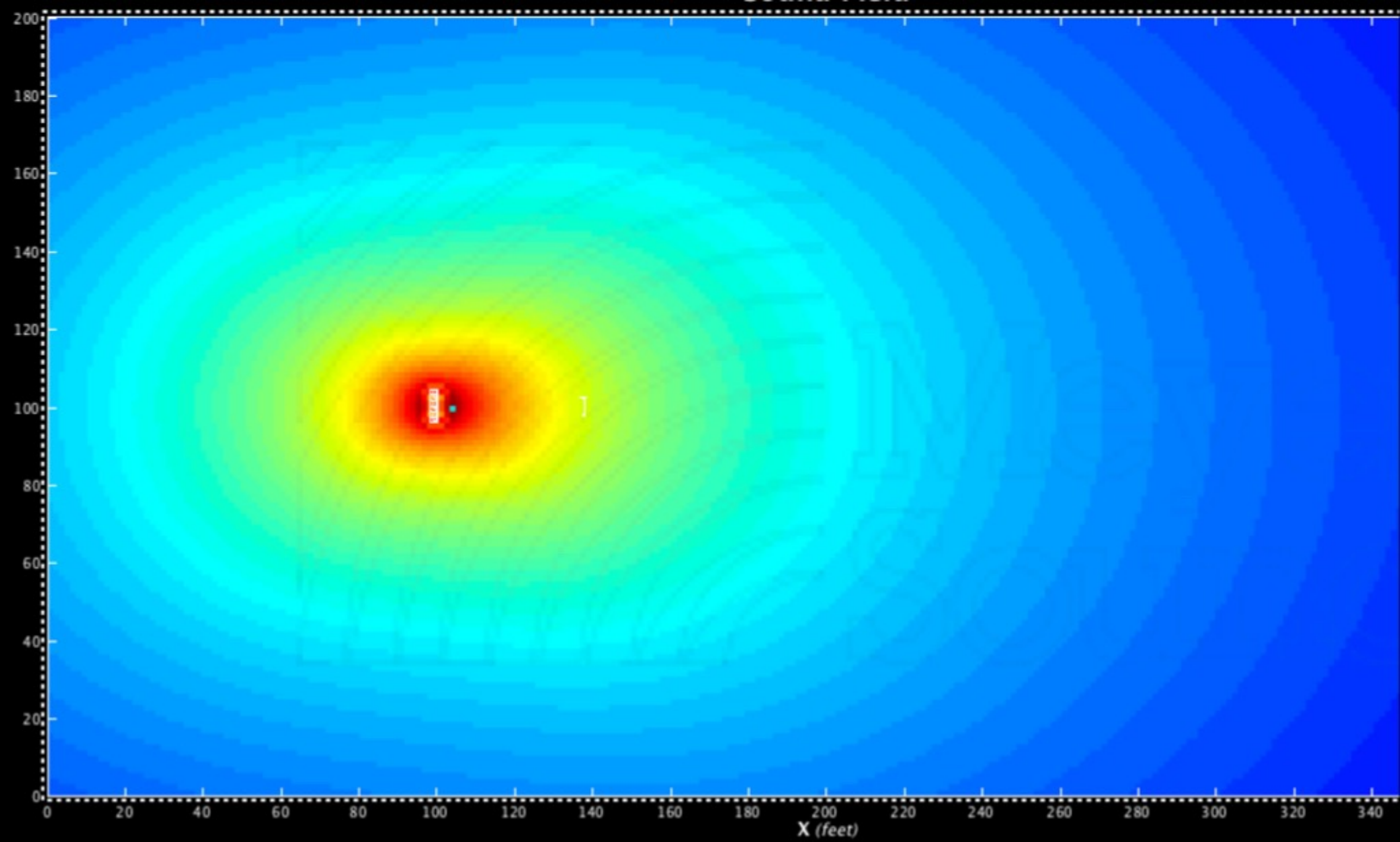

4, 8ms


3, 6ms


5, 10ms


5.62, 11.24ms

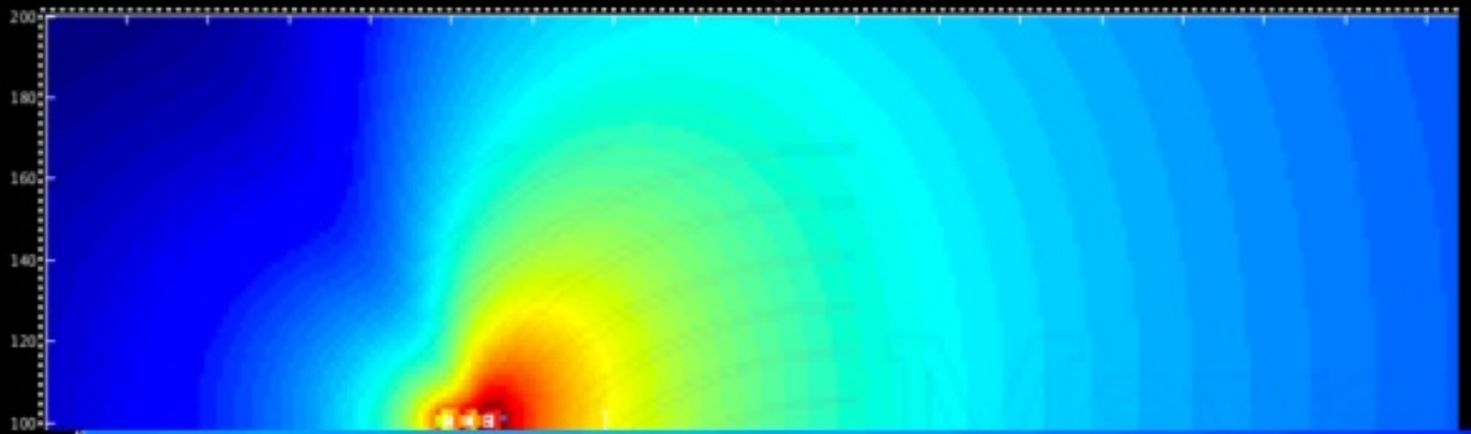

5.62, 11.24ms



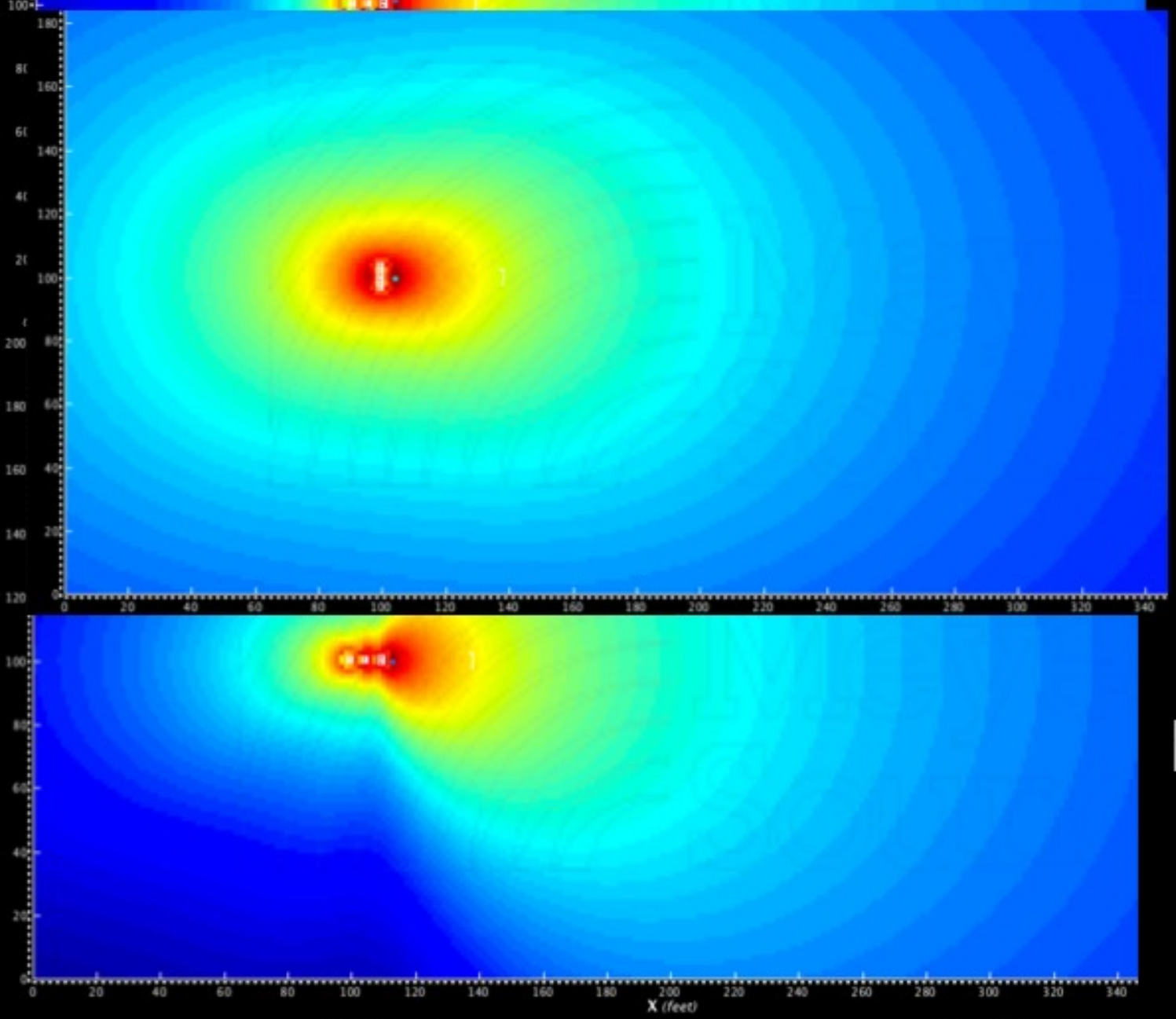
Air Attenuation On
Temperature = 68.0°F
Pressure = 1,013.25 mb
Relative Humidity = 50.0%

Relative Bandwidth = 1 octave
Center Frequency = 63 Hz
Start Frequency = 45.4 Hz
Stop Frequency = 89.4 Hz

3 USW stacked



End Fire 3ms, 6ms

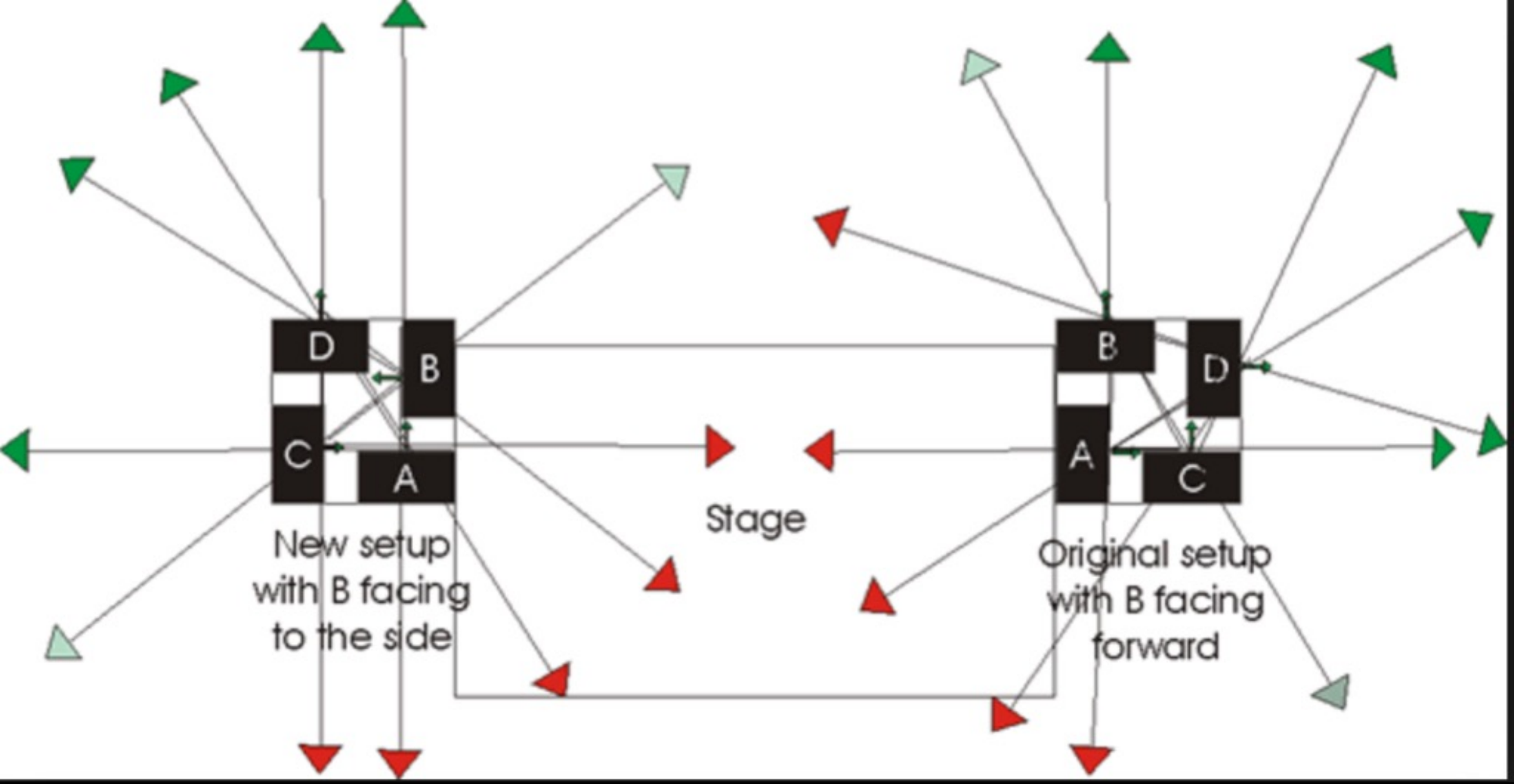


Non-Directional

End Fire 5.62ms, 11.24ms

Other Directional Arrays

Rat Sound Vortex


D
B
C
A
New setup
with B facing
to the side
Stage
B
D
A
C
Original setup
with B facing
forward

How it works

Meyer Sound TM Array Gives Metallica Even Bass Coverage on In-the-Round Arena Tour

Meyer Sound TM Array Gives Metallica Even Bass Coverage on In-the-Round Arena Tour

Intermission